AUGUST, 1950

American Engineer

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American Engineer

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". . . any Board for the licensing of members of any profession should keep the standards high so that professional ethics and conduct may be above reproach, and that men should not be admitted to the learned professions who have not the proper conception of right, justice and ethics."

—PENNSYLVANIA COURT DECISION

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• AN EDITORIAL •

This Should Be A Dry-Eyed Period

Last June 25 on a mountainous peninsula jutting out from Manchuria, five uneasy years of so-called peace ended. Five uneasy years during which the power and weaknesses of a democracy were all too often apparent. Years when America, young and too optimistic, learned the hard way about international promises and agreements. It was a period of sometimes great disunity in this country; a disunity the Soviets undoubtedly took into account before provoking the Korean affair. That they were bitterly disappointed needs no amplification here.

No group of men has a greater working knowledge of disunity than the professional engineers in America. Theirs is a profession long torn asunder by rampant individualism. Indeed, we fear they often enjoy the running exchange of ideas and independent actions. But they know, and their great accomplishments in World War II will bear this out, that disunity in or out of the profession in times not normal cannot bring about optimum results.

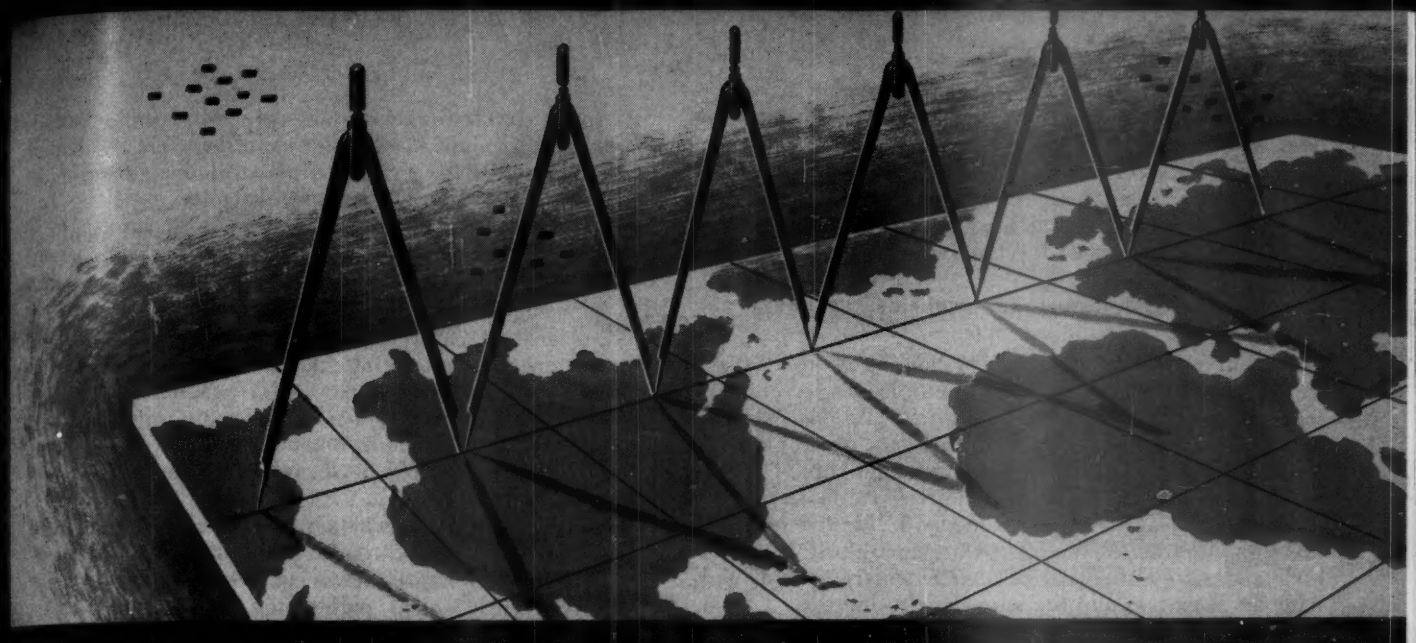
These are not normal times. Living in a world where fifteen atomic bombs could, in a matter of minutes, be fatal to the United States, calls for measured thinking and group action. For such an important segment of our population as the professional engineers to meet the challenge disunified would be most regrettable. Being of true professional stature, there is little doubt their differences will not be resolved or at least put to one side, in the face of the present emergency.

There is much to be done. The pitiful state of our civil defense program alone crys for the engineers' organizational ability and technical touch. Then, the Armed Forces have sent out an urgent call for engineering officers. Likewise, industry is again wooing the professional engineer, being in desperate need of his talents.

Professional engineers are dry-eyed straight thinkers. Together, they can probably do more than any other group toward making this crusade for a One World a reality. Can any man be but proud of a profession that offers such an opportunity for contribution?

ON THE COVER . . .

Sidney L. Stolte became the NSPE's twelfth president on July 1st, 1950. The Minnesota engineer assumes the high position at a period of the Society's history when its expanded growth and strength, requires an acceptance of greater responsibility to the profession. Our cover photograph depicts some of the goals that stretch before us; some of the jobs to be done. With the Society's inspired leadership, there is little doubt that great strides will be made toward that end in the year ahead. For a personal message from President Stolte and a list of his committee members, see pages 18 and 19 of this issue.



Engineers Can Promote *International Understanding*

By
Robert M. Gates,

Member, NSPE, and Representative of the Engineers Joint Council on the U. S. National Commission for UNESCO

THE overshadowing problem of the United Nations is the attainment and maintenance of a just and durable peace. The major task of each of its agencies is its possible contribution to that end. This is also the main concern of the American people. It enters into the thinking and activities of many voluntary groups also that are organized for other purposes—churches, professional organizations such as NSPE, business groups, and others. We believe other peoples around the world have the same concern—whatever may be the attitudes and motives of their present rulers.

This paper suggests use by the engineering profession of a fairly open road that may be used for the promotion, in all countries, of the mutual understanding that is so essential to the winning of world peace.

The underlying obstacle to progress toward world peace is in the barriers raised against mutual understanding. Neighbors, even members of the same family, have disputes and conflicts. If they have free intercourse and are working together for some common purposes, however, disputes are less likely to become serious conflicts and may be peacefully resolved. And practicable ways and means for reconciling or adjusting disputes are found where there are mutual understanding and mutual recognition of common interests. All peoples of the world, whatever the aims of groups among them, even governing groups, have some fundamental common interests that are recognized when barriers to mutual understanding are removed.

Let us review some of these barriers. One is that of language. In our Tower of Babel where we are now brought close together by new mechanical means of transportation and communication, our freedom of intercourse is limited by the variety of languages we have developed in centuries of isolation. Yet this barrier is gradually breaking down. Science, engineering, and technology are contributing to this breakdown. They have to do with materials and processes and laws which are not affected by national or racial or linguistic boundaries and scientists, engineers, and technicians in all countries have a common understanding of the meaning of the terms peculiar to their arts. Then, most of them also have had to learn more than one language in the pursuit of their profession.

Prevention of Intercourse

ANOTHER barrier to mutual understanding is raised by political, idealogical, and military groups whose aims may be frustrated by free intercourse. There are such groups in nearly every nation. They may hold up the specter of fear, or the hope of domination, or the precarious comfort of smug isolation, or other emotional considerations as motives justifying nonintercourse policies and practices. It is true that there is reason for the concern of many peoples for their national security. The confused state of world policies and the too-prevalent use of aggression in international relations have created tensions—fear and suspicion that have some foundation and justify protective measures.

Yet we must recognize that this tension must sooner or later be relaxed, and we need to explore all possible means of relaxing it, if we are to get a just and durable peace in this neighborhood of nations. The people themselves in even the nations apparently most aggressive, probably wan peace rather than war. They want to carry on their peaceful occupations and their friendly intercourse with other peoples — exchanging goods and services and information freely for mutual benefit. That is the way of human progress.

Most peoples are aware that no nation has a monopoly of the science, engineering, and technology that they can

use to raise their standard of living. We engineers may take advantage of this awareness, and the still keener awareness of those who are trained in these arts, to do a notable service to all peoples. The most exclusive nations, with the most rigid censorship, admit or even seek the technical publications of foreign authorship.

Economic Inequalities

A THIRD barrier to mutual understanding is the inequality of living conditions and of opportunities to improve them among the peoples of the world. At one extreme are millions, indeed hundreds of millions, of people who have, and perhaps always have had, incredibly poor living conditions, and who have no resources available or else no knowledge of how to use them for improvement of their way of life. At the other extreme are people with a high and rising standard of living, widely shared, and with the resources and the know-how to improve it from generation to generation. We have not been responsible for the low state of these underprivileged peoples; indeed we have made substantial efforts in some areas to improve it, and to show ways to improve it. Between the two extremes there are various gradations; but at least half the world is restless in its poverty and misery, as it comes to realize that such is not the common lot of mankind.

Modern means of transportation and communication, in so far as they have brought the less privileged peoples into contact with the more privileged, have contributed somewhat to mutual understanding, but perhaps more to misunderstanding on the part of the less privileged, since they have been subject to a flood of propaganda from within and without, as the world turmoil has reached them and raised factions among them.

The political and economic aims and practices of our own nation, even as we have tried to be helpful, are daily misrepresented, insidiously or openly, in Latin America, Europe, Africa, and Asia. Our economic strength and potential military strength have been demonstrated. Frequently, in history, even recent history, nations having superiority over their neighbors in these respects have been led to use that superiority for aggressive purposes. Many peoples have learned this by bitter experience. Suspicion of such a purpose is easily aroused against us where there is no understanding of our real ways of life and the public opinion underlying our national policies. Nor does counterpropaganda through political or military channels remove this suspicion; it is discounted as mere propaganda for selfish purposes.

Yet, gradually, the things we and other more fortunate peoples do to help those who need our help are meeting appreciative response. Notably is this true among those persons in these countries who have had most contact with our ways of life and with the translation of scientific advances into human welfare. This appreciation can percolate from one level to another as people see how they can come to share these advances, in their own ways, through the technical information and other technical aid we offer them. Thus another barrier to mutual understanding may be removed.

Technical Literature Welcome

IN many foreign countries our publications in such fields as religion, philosophy, economics, sociology, government, and even general information are not welcome because their contents, as a whole or in part, may seem subversive of prevailing ideologies or customs or traditions. Or they may contain facts or opinions regarding the country that seem derogatory in some respect. Various obstacles to circulation of our newspapers, periodicals, and books are imposed in different countries. Yet the literature that scientists, engineers, and technicians are most eager to get encounters few such obstacles.

In our scientific, engineering, and technical publications little or no political propaganda or other material is found that would be objectionable to foreign governments. In our engineering publications, for example, foreign technicians see mainly how in a multitude of ways American engineers are devoting themselves to improvement of plants, processes, and practices for production and distribution of the goods and services people want—not our people only but people in other lands. This information is broadcast for the benefit of engineers—and of people—everywhere.

For example, I note in a single issue of *Mechanical Engineering:* Descriptions of new automatic machines, apparatus for communications equipment, recent progress in railway mechanical engineering (not only in America), equipment for gas-turbine generators, underground power plants, electronic printing presses, jet engines, diesel engines, a photomicrometer, new capacity for aluminum and steel production, new aircraft safety devices, and much other such information as is useful to engineers everywhere. It contains also reports of meetings that show what American engineers talk about when they get together. And the well-illustrated advertising pages afford a further guide to the mechanical advances being made in the use of resources to meet peacetime wants. Such literature is an antidote to propaganda that the American people are occupied with plans for political, economic, or military aggression. It teems with information of things other peoples can do, with proper technical aid, to help themselves to better living.

THE American engineering societies, which publish such periodicals, reports, and other literature, have a total of some 14,000 members and subscribers in foreign countries—more than a hundred countries—and other affiliations with engineering groups and institutions abroad. It is notable, for example, that these subscribers include over 650 in Soviet Russia, over 600 in India, over 200 in China, over 1100 in South America, nearly 500 in Africa. This membership is a nucleus, though only a nucleus, of the great body of engineers and technicians around the world who speak the same language of science, have similar approaches to practical problems, and are least responsive to emotional propaganda that transgresses reality. They are concerned most with how best to do work that needs to be done in the arts of peace—work that has no national boundaries.

Here we have a wide field open for a use of the traditionally international character of technology, and the normally mutual understanding among technically trained people that will serve the interests of all concerned.

We can use it to clarify and emphasize the community of interest among all peoples—to mitigate the divisive effect of propaganda that stirs fears and hates—to build up a core of cooperative will within groups whose aid will be required to make cooperation among the nations practically effective when present tensions are relaxed and the obstacles to international intercourse are removed.

Procedural Suggestions

WHAT immediate steps can engineering societies take to promote better international understanding? A few suggestions are as follows:

1. We can and are finding out (1) where engineering and technical publications now circulate abroad, (2)

where they are available in depositories and libraries, (3) where there are training institutions for engineers and technicians, and (4) where foreign students who have had such training in our own institutions are now located. This information may be obtained from U.N. organizations, from consular agencies, from engineering societies and their affiliates, from publishers of technical books and periodicals, and from other sources. This involves a considerable amount, but not a prolonged period, of integrated research.

2. Ways and means may be devised to use this information to provide a wide distribution of technical literature —periodicals, reports, and books—where there is reasonable assurance that it will be used. Some suggestions of kinds of distribution include:

(1) Supplies of such materials to agencies now engaged in distribution of relief, for free distribution in accordance with reported need within the reach of such agencies.

(2) Supplies to present foreign depositories for sale at cost plus commission for distribution where such arrangements can be made; in the case of technical books, arrangements should not be destructive of present commercial practices. And the current coupon system may be used for payment.

(3) Gifts to libraries and training institutions supplementing their present purchases, if any, for their use within the institutions or even some distribution outside. In many of these countries, the direct or indirect impact of war stopped entirely the flow of such literature from abroad—even shut off local publications, or destroyed the accumulation of years.

(4) Extension of some type of membership in our professional technical societies which will assure receipt of reports and other information.

(5) Cooperation of organized foreign technical groups in whatever ways may promote effective distribution and use of material meeting needs in their respective areas.

3. To meet the cost of such an undertaking a variety of suggestions occur, including:

(1) appropriations by engineering societies and perhaps advertisers in their publications toward the cost of distribution of these publications;

(2) concessions by publishers of technical books—perhaps the issue of special low-cost editions;

(3) appropriations by a foundation to finance the whole undertaking, on the basis of nonprofit participation of engineering societies and publishers;

(4) U. S. Government, or a UN agency (for instance, UNESCO), might finance the undertaking, or at least aid in some phases of the project;

(5) Universities and colleges, as publishers or otherwise, might aid in furnishing useful material;

(6) For some countries the problem of translation would need to be taken up if the need justified it, but foreign professional engineers generally have learned English as well as their native language.

ENGINEERS share the common concern for the promotion of better international understanding and the achievement of a just and durable peace. And their training and experience give them more than ordinary concern with practical approaches to the problem. Their ways of service must take into account human as well as technical realities.

The procedures which have been suggested should not be approached in the spirit of merely charitable giving, but with the conviction that peace and mutual understanding are desired by all peoples and benefit all peoples. No matter how desperate their condition may be, people desire to help themselves. It is our task to help them overcome the obstacles that stand in the way of helping themselves. In so far as the obstacles are economic, as, for example, unfavorable exchange rates, aid can be extended without damage to initiative, incentive, or self-respect, if the proposed program is intelligently administered. Only by such intelligent administration can engineers work effectively for peace and better international understanding for the benefit of themselves and all peoples everywhere.

These engineering students' books may be dust-gatherers after graduation. They could play a large part in promoting international understanding.

How A Professional Attitude Can Be Instilled in Engineers

By

W. R. Woolrich,

Dean of Engineering, University of Texas, and Member, NSPE

WITHIN the circle of the vocations requiring advanced academic education and professional training, the engineers of the United States are recognized as being near the top in their self analysis of the educational needs of those seeking to enter the profession. The open-mindedness and devotion of a large number of professional engineers working especially through the American Society of Engineering Education, the Engineering Council for Professional Development and the professional engineering societies has placed the American engineers in the forefront in developing a high level of guidance, education, training and recognition in comparison with other professions.

The response to this consecrated effort of the leaders of the profession by the rank and file of practicing engineers is gratifying if we reflect upon the advances made in national recognition and appreciation of the engineering profession during the past half century. When we note that the civilian engineer did not rate in any part of the world so much as a fraternal club before 1771, and that even in this first organization, which historically was known as the Smeatonians*, it is reputed that not more than fifteen of its maximum membership of sixty-five were other than tradesmen, we can gain some objective idea of the rise of the profession in international esteem in the 179 years of its growth.

The profession is still plagued by a confused use of the word *engineer*. As was pointed out by the late Dr. William E. Wickenden in his "Second Mile"*, "when any word acquires a halo of distinction, everyone wants to claim it and the value of the word is quickly destroyed by indiscriminate usage." The very fact that great numbers of men trained in closely related trades and professional fields are attempting to have themselves classified as engineers is in itself indicative of the distinction professional engineers are obtaining in the world picture of the professions.

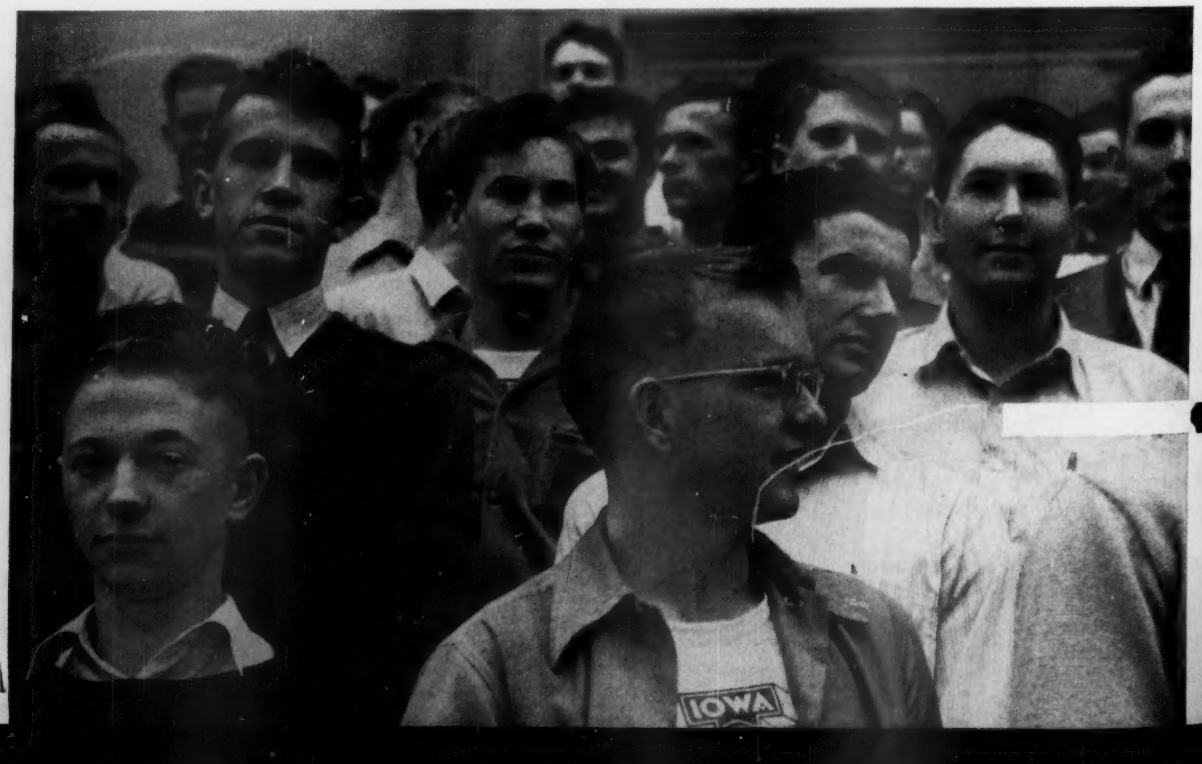
As a matter of Latin derivation, the engineer is a man of "creative ingenuity" and today in most of the nations which have an official language that has a Latin base, the engineer is recognized as a man of high academic and professional scientific attainment in conformity with his Latin definition.

IN Great Britain and those countries related to the British Empire by both language and blood tie, the definition more commonly accepted by the public is that an engineer is a man who has displayed handicraft skills in working with engines and machines in addition to having acquired a sound technical education. In other words, the engineer in the public Anglo-Saxon mind, derived his title from the word *engine* and they think of him as a builder of machines and bridges and an operator of steam and gas engines. Historically, this definition became most firmly fixed in the British layman mind through the course of events that followed the development of James Watt's improved stationary steam engines and later Stephenson's steam

*The Smeatonians were organized by John Smeaton in 1771 and continued until 1792. The formal Society of Civil Engineers was organized in 1793 with a maximum legal membership of 50 and was the forerunner of the present Institution of Civil Engineers established January 2, 1818. Biographer Sir Alexander Gibb says of the Society of Civil Engineers: "It was the first engineering society to be formed in the world." The Smeatonians were a fraternal group of kindred minds but so few of them rated as engineers that they are not accorded the distinction of an engineering society.

*The Second Mile—W. E. Wickenden. Published by the Engineering Council for Professional Development, New York.

Tomorrow's engineers must be *engineers plus*, says Dean Woolrich.



locomotives, both of which gave rise to the expansion of opportunity for skilled tradesmen who could construct, repair, and operate power plant equipment.

The problems, therefore, of developing professional attitude in technically trained engineers in both the British Empire and the United States entail two major jobs (a) the thorough indoctrination of the men in training about the distinctive marks of a professional engineer, and (b) the persistent and continuing education of American youth as to the difference in the work of those devoted, skilled tradesmen who are specifically trained to operate and repair stationary and mobile engines and the professional engineer who, under the most current recommended definition proposed by the Engineering Council for Professional Development, is best described by the following statement:

"An engineer is characterized by his ability to apply creatively scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design, and of the limitations of behavior imposed by such design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation, and safety to life and property."

THE indoctrination of the men in training about the distinctive marks of the professional engineer is the job of established engineers from the University lecture rooms, from the engineering offices, and from the registration boards.

For this part of the program it will be very necessary to do some missionary work with many of the members within the profession who have become chronic critics of the profession by decrying generally the engineer's (a) inability to speak in public, (b) civic and religious indifference, (c) social misfittedness, and (d) lack of diplomatic adroitness. Reliable sample studies have been made of the major professions which indicate that this profession itself has greatly underrated its own position. In each of these fields, engineers rank well in comparison with other professions and, in some, it tops the list. Our profession is often guilty of self-abasement. Can we expect to instill the professional attitude in others when some of our compatriots are prone to appraise the profession of which they are part at far below par? Professional idealism does not advance forward when the transmission is mostly in reverse.

To instill the professional attitude of the engineer, may we quote the first four paragraphs of the objective creed of the engineering profession as presented to the Eleventh Annual Meeting of the Engineering Council for Professional Development, entitled, "Faith of the Engineer," and which reads as follows:

"I am an Engineer. In my profession I take deep pride, but without vainglory; to it I owe solemn obligations that I am eager to fulfill.

"As an Engineer, I will participate in none but honest enterprise. To him that has engaged my services, as employer or client, I will give the utmost of performance and fidelity."

WHEN needed, my skill and knowledge shall be given without reservation for the public good. From special capacity springs the obligation to use it well in the service of humanity; and I accept the challenge that this implies.

"Jealous of the high repute of my calling, I will strive to protect the interests and the good name of any engineer that I know to be deserving; but I will not shrink, should duty dictate, from disclosing the truth regarding anyone that, by unscrupulous act, has shown himself unworthy of the profession."

To instill the professional attitude may we also repeat our own code of ethics. I have been interested to find that many of our nation's vocational advisors were surprised to learn that the engineering profession has a very comprehensive Canon of Ethics directing our relationships *to* men of other professions, *to* the public, *to* the client and employee and finally *to* other engineers. Suffice here that we quote the foreword of these Canons which read as follows:

"Honesty, justice and courtesy form a moral philosophy which associated with mutual interest among men constitute the foundation of ethics. The engineer should recognize such a standard, not in passive observance, but as a set of dynamic principles guiding his conduct and way of life.

"As the keystone of professional conduct is integrity, the engineer will discharge his duties with fidelity to the public, his employers and his clients and with fairness and impartiality to all. It is his duty to interest himself in

Today's complex world calls for professional engineers of full stature.

public welfare, and to be ready to apply his special knowledge for the benefit of mankind. He should uphold the honor and dignity of his profession and also avoid association with any enterprise of questionable character. In his dealings with fellow engineers he should be fair and honest."

AGAIN, to instill the professional attitude, may we recognize the engineer as a member of one of the most constructive of the professions. To the gentile, it is a Christian vocation, to the Hebrew, it is in full compliance with the Mosaic law, to the several Oriental religions it provides that essential "know how" of material productivity that in their thinking so generally gave the Occidental World its leadership. The hundreds of Oriental graduate students pursuing engineering in the United States today is realistic evidence of the place of engineering in the planning of their economic industrial future.

May we turn now to the educating of the youth leaders of America on the true function of the professional engineer.

To accomplish this briefing and education of the youth advisors on the meaning of engineer, the writer would suggest that the organized engineering profession take unto itself for the next decade the task of emphasizing the true responsibility of the professional engineer by

1. National articles on the subject to be submitted to the educational journals of the land.
2. Preparation and broadcasting of a brief primer bulletin defining engineering and the engineer for Boy Scout and other boys' club leaders.
3. Specially preparing engineering application stories for the popular religious and vocational magazines in which would be stressed the science and cultural aspects of engineering.
4. Preparation of manuals on Engineering appreciation to be used in teacher's college and University work shops engaged in preparing secondary and high school teachers.
5. Develop a coordinated system of syndicated and local releases on such subjects as "New Highs in Science and Culture of Engineering," "The Engineer and Atomic Science," "The Engineer and the Planning of Our City," etc.

IN some of these enterprises, the coordinating activity should be under the direction of the national engineering bodies and for others the State or local engineering faculties and societies can be most effective. In any event, it should all be masterfully done if it is to accomplish the big job that is ahead.

Some professional engineers may question whether there is much to be gained in trying to instill the professional attitude in young potential engineers by undertaking such a gigantic task as that of educating the national advisors of youth to the opportunities and obligations of the professional engineer. Is it not as necessary that we prepare the public to accept the definition of the professional engineer in its true perspective as it is to indoctrinate the men who have acquired or are acquiring such distinction? For example, the task of developing a professional attitude in young engineers in any of the Latin American nations is greatly simplified by the fact that in the public mind the designation *ingeniero* ranks near the very top of the professions in those countries. Those who have had close contact with Central and South America can testify that those who strive to reach the distinction of being a professional engineer in those countries recognize the obligations attached thereto without great emphasis or any further indoctrination process from their engineering mentors.

May we now turn to the more parochial and personal aspects of our obligations as professional engineers in instilling professional attitude in the oncoming generations. Many of us have probably been too comfortable in our consideration of this program in that we could sit back and soliloquize that this is all work for our national, state and local officers, and they should do something about it. Let us face this program personally. Everyone of us have failed our task if we do not do our part.

TOO many of us are so afraid we are going to wear ourselves out that we rust out instead. Poor old Methuselah, his only recorded accomplishment was that he lived, had children and died at nine hundred and sixty-nine years. What a pitiful record for nearly a thousand years chance to do something for humanity. You could have the same epitaph for your favorite tom-cat that you consigned to the incinerator some yesteryear except that he was not accorded the opportunity of chanting his love song for ten centuries and for that your neighbors are relieved.

As valiant Sons of Martha* may our epitaphs be more inspiring. If we cannot be active reagents may we be good catalysts but never inert souls. If we are to inspire, then, in the proximity of our homes, our community, our civic organizations and our churches, each one of us has an immediate obligation to serve our profession by example and by precept.

As your number one obligation in this personal program of inspiration by example, may we place your own cultural and scientific growth first. Those early Smeatonian engineers of 1771 experienced less engineering advancement in a lifetime than the engineer of today enjoys in the four or five-year period required to obtain a Bachelor of Science degree. Each professional engineer owes it to the profession to continue his education and grow with the enlarging field. To be leaders and preceptors we must first keep ahead of the procession in the current applications of the basic knowledge we have acquired.

Not far down the scale we owe it to the profession to learn to speak with authority in technical, community and social or religious assemblies. Engineers speak well because they have acquired a sound recognition of the physical and economic laws of the universe. More of our profession should utilize this asset they possess and project it forward into community and private gatherings.

THE score of professional engineers participating in civic, social and religious work is much higher than most citizens recognize. In so many spheres of life they serve with a high degree of modesty and without the "blare of trumpets" but they serve well. This part of our obligation contributes the most civilizing effects upon our human race and as administrators of both gigantic physical forces and large numbers of less scientifically trained citizens, we should find our rightful seat each week in the civic and religious services of our choice. If we are going to be citizens of this town of ours, then let's not be half-baked citizens. If we are going to be church members—no matter what the creed—then as creative scientists we should take our full share of the load in guiding the great scientific endeavors with the humanizing attributes of an unselfish religion.

An old teacher to whom the speaker owes much, pointed out that the human being who has acquired a level of intelligence society terms civilized, possesses five instincts that should motivate him. If he over-stresses any one of these to the detriment of the other four, he develops an unbalance in his own personal life. These instincts are:

*The designation as Sons of Martha is a Canadian recognition of professional engineers and the title is used by them in dramatizing the engineering profession. See Rudyard Kipling's "Sons of Martha," dedicated to the Canadian Engineers.

Professional engineers work close to the human family in laboratories, shop, mine, refinery, boiler room or construction camp.

First: The instinct of good workmanship leading to an increase of material goods and the satisfaction which their *use* brings.

Second: The instinct of intellectual expansion by which knowledge is increased and understanding of himself and the universe in which he lives is enlarged.

Third: The instinct of religion and morals. Man would like to enlarge his experience and fellowships with God and develop and enlighten his moral sense and improve the quality of his moral character.

Fourth: The aesthetic instinct. Men crave larger portions of beauty and would like to develop their power of appreciation of the beauties of nature and the treasures of art with which the world has been enriched.

Fifth: Generally, man has an instinctive desire to participate in the social life and courteous manners which characterize human society at its best.

A TRULY civilized society is one that successfully balances all of these instincts in a full expression so as to permit no predominance of one or more of these instincts at the expense of others.

In my final concluding remarks we should make it absolutely clear that each one who seeks to become a top flight professional engineer in this or any other commonwealth of the United States must first meet the minimum requirements in the accepted prerequisites of an engineer—that is, basic education in the theory and application of mechanics, thermodynamics, electricity, chemistry, and fluid flow. The method of such education is unimportant, but the achievement is the essential.

These requirements are the minimum for a professional engineer—but since we are called upon to work close to the human family in the shop, mine, refinery, boiler room, construction camp, or "what have you," and since better than sixty per cent of us do eventually become administrators of men, the new developments in nuclear energy, with their expanded human relation implications, do make it mandatory that engineers more than ever before be henceforth *engineers plus* if we would effectively serve the oncoming generations.

THE professional engineer in his greatest fields of usefulness has been for generations the liaison representative between the pure scientist financier and the social scientist on the one hand and the men and women whom he directs on the other.

The new forces that have been unleashed by the atomic scientists in a world that is attaining new levels of sensitivity for the social welfare of the human being both broadens and deepens the stream of obligations of the professional engineer of full stature.

This is a challenge to the best that is in any and all of us and places the role of the engineers in such a high position in world affairs that any failure on our part to instill a high professional attitude in the oncoming generation of professional engineers would be an unpardonable sin of omission of the profession.

As a profession we are moving upward at a rapid rate. Our full acceptance of our new opportunities and obligations in all of their implications will be the most effective act we can perform in instilling professional attitude to our fellows of the profession. By our works they will know us.

This paper was given by Dean Woolrich at a recent meeting of the San Jacinto Chapter, Texas SPE.

Public Relations—A Modern Necessity

By
Ed Lipscomb

Director of Public Relations,
National Cotton Council of America

Editor's Note: The following remarks are excerpts from a booklet written by Mr. Lipscomb on public relations. The booklet, designed to impress the agricultural field with the pressing need for active public relations, expresses many thoughts we believe of interest to the engineering profession.

THERE was a time in the early days of the nation when 90 per cent of all gainfully employed Americans were engaged in agriculture, when more than 90 per cent of the population lived on farms, and when a proportionate percentage of the national income was derived from agricultural production. Gradually, but with amazing steadiness, the statistical position of agriculture has declined until less than 16 per cent of gainfully employed workers are now in agriculture, less than 19 per cent of the population is on farms, and approximately 15 per cent of the national income is derived from farm products.

There was also a time, within the memory of many living Americans, when the average consumer was acutely conscious of the farm as his direct source of day-to-day sustenance. Most of his food was grown at home, or purchased direct from a nearby farmer, or bought from a small and friendly merchant who knew personally the farm sources of much of his goods.

Today's consumer thinks in terms of the supermarket and the chain store. He pays his money to a stranger, gets his vegetables frozen or in cans, selects meats processed on an assembly line, buys cereals in cellophane, and looks upon the entire procedure as a cold impersonal transaction between him and an automaton. Indeed, in many cases he virtually has come to take his food and clothes for granted, or to look upon them as obligations which society owes him—items he need worry little about while he devotes his major energies to the acquisition of automobiles and television sets. Certainly he has lost, to a considerable extent, his feeling of personal dependence on the farm and his immediate interest in the farmer.

Factory Over Farm

SIMILARLY, many communities which once thought primarily in terms of the farm now think almost wholly in terms of the factory. Such communities compete for the payrolls of new industrial plants, pull rural labor off the land, bid up the wages of farm workers who are left, and in general demonstrate relatively less concern for agricultural progress than for industrial expansion.

Today's Fight for Public Favor

Reduced numbers, lower percentage of national income, and increased economic dependence all endanger the farmer's historical position in national affairs. Yet by far the greatest threats to his influence are new. They consist of conscious and calculated programs being conducted by organized groups which are bidding fiercely for the moral and political support of the American public.

The fundamental concept which motivates group effort today is wholly sound—that is, the concept that the group which wins the public wins its case. For public opinion, beyond question, is the sovereign power and the court of final appeal in a democracy such as ours. It puts political parties in and out of office, it makes and breaks men and industries, it determines what is good and what is bad, what is pretty and what is ugly, when a short skirt is stylish and when it is carnal, when vitamin pills are beneficial and when they are bunk.

EVEN before the development of pressure groups as we know them today, and well ahead of the invention of such opinion-influencing devices as radio and talking pictures, Abraham Lincoln summed it up in the statement, "Public sentiment is everything. With public sentiment nothing can fail; without it nothing can succeed; consequently he who molds public sentiment goes deeper than he who enacts statutes."

There is no difference in the actual power of public opinion today and in the days of Lincoln. It is still true that governmental consideration of national economic questions is influenced as much by public attitudes and reactions as by arithmetic. It is still true that when the public is optimistic and confident, business and industry are inclined to take the risks of expansion; and when the public shows signs of fear and uncertainty, manufacturers and even retailers will trim their operations and cut their inventories regardless of any rose-colored figures which economists may parade before them.

There is a tremendous difference today, however, in the techniques through which public opinion can be influenced, and in the speed with which the public can be reached. *Today the group with money and a message can talk to as many as 80 million listeners in their own homes simultaneously.* Through print, picture, and sound, every normal American citizen in every state of the union can be reached with a speed that Lincoln would have found incomprehensible.

Unfortunately, modern speeds and techniques of communication frequently mean that unsound and undesirable ideas and causes may be so cleverly presented and so often repeated that they may win the support they seek. Similarly, a laudable movement, a worthy cause—or the needs of even so important a group as American professional engineers—may be disastrously neglected if the merits of the case are not impressed upon the public mind and successfully sold to the masses.

Certainly under today's social setup and political practices, a successful job of winning understanding and influencing the public has become the indispensable ingredient of any effective program involving the welfare of a major group. *Hence it should be no surprise that the groups which during the past decade have made the greatest progress in their efforts to win dominance of national life would be groups which have given top priority to the job of opinion molding.*

Other Groups Want Other Things

Labor unions and the executive branch of the federal government are the largest but by no means the only groups in America which are attempting through campaigns and programs of various kinds to sell their ideas

and opinions to the public. Before the war, forty states had set up promotional budgets, and many cities and counties had established public relations, publicity or advertising programs to attract industry, tourists, capital, and other assets.

Industries, trade associations, and individual companies in increasing numbers are conducting carefully planned programs to win public confidence and support. The alcoholic beverage industry is seeking through enlightened public relations techniques to minimize the opposition of crusading drys. The railroads are pleading their cause before the public in national magazine advertisements; individual roads are buying goodwill-building space in newspapers on their lines; and dining car menus are striking a blow against special taxes on tickets.

BOWLING alleys a few years ago were looked upon by the public as basement or second story affairs one step ahead of pool rooms. Intelligent public relations, financed by manufacturers of balls and pins and other equipment, has converted bowling into the nation's most popular and most widely patronized indoor sport. Thousands of supermodern alleys include ministers and ladies as regular patrons, and "leagues" of church teams compete in major cities.

The National Association of Manufacturers is seeking a sympathetic public ear for the problems of industry. The U. S. Chamber of Commerce is urging greater public appreciation and protection for small business. The jute mills of India are willing to place hundreds of thousands of dollars behind a program of goodwill for burlap bags among American farmers. And the lawyers of Virginia have appropriated funds to explain the functions and virtues of the legal profession to the citizenship of their state.

Throughout the land, group after group is learning that it moves more rapidly ahead when it becomes fully conscious of the all-controlling power of public opinion, and sets out actively to earn and retain public favor.

Handicaps in Raising Money

In today's organized competition for public favor, any program for such groups as agriculture and engineering must face substantial disadvantages as compared with the programs of labor, government, or industry.

The farmer, like the professional engineer, does not have, and would not tolerate, any organization with the compulsory dues and assessment power which unions exercise over their memberships—power so complete that a union could, and did, bar the world's best known motion picture director from further employment in the movie industry because he refused to pay a one-dollar special assessment. A one-dollar special assessment by the AFL for public relations would mean a $7 million program, and by the CIO, $6 million.

GOVERNMENT public relations programs have behind them the financial support of taxation. Thus the pocketbook of the prospect becomes the source of funds with which to persuade him. Frequently the limiting element is not so much the volume of expenditure involved as it is the point at which fear of political exposure exceeds the desire to proceed. Subtlety of execution and genius of disguise in such cases are more important than budgets. Taxpayers may frown on direct appropriations for federal publicity, but diversion of the salaried time of highly placed administrative and executive officials is difficult to control.

Industry's advantage in public relations financing lies in the relatively small number of large manufacturing units whose cooperation is needed, and the high average potential contribution per unit.

The volume of manpower which can be placed behind any agricultural program of public relations is as voluntary as is the volume of money. In enlisting manpower as in soliciting funds, the engineer or the farmer does not have any weapon of coercion comparable with those available to labor and government. The same union dictation which can deny a man his job for failure to pay an assessment can deny it for failure to perform an assignment. Similarly, among government employees, the continuation of the monthly paycheck is a potent persuader. Certainly the existence of such weapons, whether they ever are used or not, is conducive to a degree of discipline which agriculture or engineering cannot match.

The Program

How, without a national fund competitive in size with the public relations budgets of government, labor, or industry—how, without the payroll control of government, the disciplinary powers of unions, or the limited numbers of industry—can agriculture or the engineering profession finance and man a program of sufficient size and effectiveness to maintain and strengthen its position of national leadership and public favor? How, under such conditions, can it cash in on its position of indispensability, on the latent sympathetic interest of a majority of the public, on the quality of its leadership, and on the potential strength and cooperation of its allies? How can it, through modern techniques of mass persuasion, protect its own welfare and at the same time serve the interests of the public and the nation?

THE answer lies in one of the most fundamental and infallible laws of public relations—*the law that the total of public opinion is equal to the sum of private opinions.* Mathematicians express the same principle in the elementary geometric theorem that the whole is equal to the sum of its parts. In other words, every last man must become public relations conscious. He must follow the lead offered by whatever program his organization can embark upon —large or small—*and help do the selling!*

Effects of Good Public Relations

An intelligent and energetic program of public relations is the natural and certain answer to the problems of organizational strength. Such a program automatically generates publicity and increases prestige—both matters of primary importance to the health and progress of the local chapter.

Publicity and prestige mean increased membership, and increased membership means new usefulness and power. No one wants, on the other hand, to belong to a passive, little-known group. Enthusiasm of workers, diligence of committees, collection of dues, and attendance at meetings will grow while all the other problems and headaches of organizational operation are certain to shrink as the public relations program expands.

The idealistic attitude of doing a good job and letting the credit take care of itself becomes pure stupidity when adopted by an organization operating in the pressurized atmosphere of today. Not only is it desirable that the group attract to itself as much favorable attention as possible; it is further advisable for it to dramatize its service and accomplishments in such a way that they will have maximum personal meaning to as many individuals as possible. The organization which lets its light so shine before men that they may see its good works will be glorified by its members. It will also find itself prepared when the necessity arrives for increasing the candlepower and intensifying the voltage.

THE PROFESSIONAL ENGINEER . . .

"To ensure the highest possible standard of Engineering service."

The quotation is from the Constitution of the New Zealand Professional Engineers' Association, doubtless written only after serious consideration of the basic aims of the organisation. It serves to emphasize the point that economic interests, while of immediate concern to many engineers, must be kept in true perspective. The Association could very easily adopt the role of a trade union and indulge in a multitude of disputes with engineer employers regarding salaries, overtime, working hours, expenses and the like. Such negotiations are inevitable but, it is believed, are of secondary importance to the building up of professional status and the encouragement of an attitude of mind within the profession which attaches due importance to those factors characteristic of the professional man.

Daniel W. Mead, the well known American authority on engineering contracts, is equally respected for his views on education and ethics. A coveted prize of the American Society of Civil Engineers for the best paper on engineering ethics is named in his honor. In his standard text book "Contracts, Specifications and Engineering Relations" he refers to an investigation carried out under the auspices of the Carnegie Foundation to determine the qualities required for success in the engineering profession. The considered opinion of over 5,000 members of engineering societies is illuminating, as shown by the following ratings of groups of attributes:

Character, integrity, responsibility, resourcefulness, initiative	24.0
Judgment, commonsense, scientific attitude, perspective	19.5
Efficiency, thoroughness, accuracy, industry	16.5
Understanding of men, executive ability	15.0
Knowledge of fundamentals	15.0
Technique of practice and of business	10.0
	100.0

Such numerical evaluation of intangible qualities may be questioned even by the statistically minded engineer. Moreover, the figures can be accepted only as an average and obviously must vary widely in assessing specific positions. To instance examples familiar to all, the designing engineer of a state department should properly possess characteristics vastly different from those of a district engineer. Nevertheless the emphasis given the first bracket of qualities — character, integrity, responsibility, resourcefulness, initiative—is significant and particularly so when it is seen that the lower two —knowledge of fundamentals and technique of practice and of business —are considered of relatively minor importance.

There is no suggestion here that technical education, training and experience should be under-estimated, no implication that senior engineering positions could be successfully held with a mere smattering of engineering knowledge. We must bear in mind that the specification applies to those equipped to climb to the top of the professional tree and that few, if any, will be found possessing such balanced blend as to approximate perfection. The point of real interest is, briefly, that professional success is so generally believed to be greatly more dependent on the cultivation of desirable personal characteristics than on exceptional technical ability.

If this is so for the individual we might reasonably consider such factors a basis for estimation of the profession as a whole. In these enlightened days the purchase of a kit of tools may qualify a labourer for carpenter's rates of pay, but does not in the public mind stamp him as a skilled tradesman. The analogy is clear—the acquisition of a technical education does not automatically confer professional status.—*The Professional Engineer, New Zealand Professional Engineers Assoc., May*, 1950.

ENGINEERS AS ORATORS . . .

Industrial and business leaders recommend speech training for engineers, according to Albert A. Rights, assistant professor of English at Lehigh University, Bethlehem, Pa., who addressed more than 300 delegates attending a regional meeting of the American Society for Engineering Education, Lehigh University, May 13, 1950. His address, "What Industry and Business Expect of College Trained Men in Oral Communication," was based on a recent survey of over six-hundred responses and interviews of leaders in industry and education.

Reporting the findings of the survey sponsored by the Lehigh University Institute of Research, Professor Rights said that industry and business "have been searching for the explanations of the many failures of college-trained men and women to express themselves adequately in oral and written communication. These failures have extended from the writings of work-progress reports to the complex give-and-take of labor-management mediation.

"Although in recent years liberal electives for speech training have been available to engineering students, few have taken advantage of these courses because of the great demands of the scientific curriculum. Industrial leaders believe this neglect should be remedied. They suggest that specialized communication teachers be developed within the curriculum of engineering, and that cooperation of the teachers of engineering courses be urged as much as possible."

Professor Rights outlined the scope of the survey as (1) the validity of the criticism of industrial and business leaders; (2) the causes for the criticism; (3) the present practices of colleges in teaching oral communication for engineering and business students; (4) what industry and business leaders expect college men to learn in basic and advanced oral communication skills for their professional needs; and (5) what various individuals of industry have found of most value in their personal training of communication skills.

The survey revealed that engineering students as a group got less training in oral communication than any other group. "Essentially industry has been assuming some of the burden of training college engineers in communication skills. The majority of

executives and supervisors of training programs do not favor this responsibility," Professor Rights said.

"Industrial leaders place much emphasis upon correlation of visual demonstration with speech materials, business dictation, and vocabulary building. According to executive management, more could be done in the integration of writing and speech training. Management also recommends that courses in personnel administration, industrial management, and engineering conference should be more closely integrated with communication training." — *Mechanical Engineering, July*, 1950.

DEVELOPING PROFESSIONAL COMPETENCE IN INDUSTRY . . .

If industry is to discharge its full responsibility and maintain a position of leadership in our economy, management must take a deeper interest in developing the professional competence of its people. Through the technological developments of industry, our nation has achieved a level of material progress unmatched in the world. To this achievement, engineering has made a major contribution. But our progress in the area of human relations has not kept pace with our technological advancement.

If our task of developing professional competence is to become manageable, we must know the specific qualities which make up the type of individual we want. To get anywhere, we set objectives. What are the qualities which make for success in industry? This is a philosophical question, and we must be careful not to give a philosophical answer, that is if we want our answer to be useful.

Engineering Fundamentals. The first requisite for success on an engineering job is a knowledge of the science and art of the field and the ability to think clearly.

Desire to Get Ahead. Motivation is essential. Successful men have the ability to create challenges within themselves which impel them toward achievement.

Capacity to Deal With People. Results are accomplished through the efforts of people—people working as a team. In industry no one works alone.

Adaptability. To progress, one must adjust himself to changing conditions. In part, adaptability is a result of a good fundamental education and broad experience.

Emotional Maturity. This quality is significantly related to job stability and social adjustment. The ability to see human situations in their proper perspective, the capacity to think objectively on human problems, and the power of self-analysis without being unduly critical are indications of a well-adjusted person.

Response to Adversity. A professional career is not all smooth sailing. Sometimes, the best plans go wrong. How the individual responds to adverse conditions has a bearing on his future.

Vision. Industry needs men of vision and creative ability. Men who can thrust their imagination beyond the immediate problems and grasp a vivid picture of their final achievement.

Business Judgment. The ability to size-up a situation, whether it involves human relations or technical factors. and reach a reasonable decision cannot be overemphasized.

Effective Expression. Even the best ideas have to be sold. The ability to express one's self through both the written and the spoken word is an attribute of major importance.

Integrity. This quality, together with an appreciation of professional ethics, loyalty to his company, and proper regard for confidential information, are inherent characteristics of a professional man.

Our next step is to prepare a plan which will develop the qualities we have outlined as desirable. Needless to say, we have carved out a man-sized job for ourselves. It becomes immediately apparent that a positive program of action is required. Moreover, we must do some broad-gage thinking or we shall fall short of the mark. I should like to offer a six-point plan for your consideration.

1. *Selection and Recruitment*

The first requisite in building an organization for the long pull is the recruitment of capable people. It is not only important that a company have a flow of new blood into the organization, but it must be the right type. Careful screening of candidates is essential, since an engineering degree is not, in itself, evidence of fitness for a particular company.

2. *Initial Training*

A well-organized training program not only helps the young engineer make the transition from the college campus to a productive job in industry, but it gives him the specific knowledge he needs to move forward. His formal engineering education has given him an understanding of fundamentals. Industry must provide the industrial "know-how."

3. *Follow-up Training*

But initial training is not enough.

(*Continued on page* 32)

OUR AUTHORS

Robert McFarland Gates, (Engineers Can Promote International Understanding—Page 5), was born in Iowa. He graduated with a B.S. in M. E. from Purdue in 1907, and was awarded a doctorate in 1944. He was president of the ASME in 1943 and 1944, and is a member of NSPE along with many other organizations. From 1943 to 1945 he was a member of the Engineers Joint Council, and is now that group's representative on the United States National Commission for UNESCO.

Willis Raymond Woolrich, (Engineers and Professionalism—Page 8), Dean of Engineering, University of Texas, was graduated from the University of Wisconsin in 1911 with a B.S. in E.E. He received his B.S. in M.E. in 1923. Dean Woolrich had vast experience in both commercial and government engineering before entering the educational field. He joined the University of Texas in 1936, and has, since that year, been Dean of Engineering and Director, Bureau of Engineering Research. He has been an official of many engineering organizations, and is an active NSPE member.

Ed Lipscomb, (Public Relations—Page 12), has been sales promotion and public relations director of the National Cotton Council since it was established in 1923. He is a widely known public relations authority, and is presently a member of the Board of Directors and the Executive Committee of the Public Relations Society of America. He is a graduate of the University of Mississippi, and has had extensive experience in the newspaper field.

Full Text of NSPE's Position On Collective Bargaining

Because of its extreme importance to the engineering profession in general and employed engineers specifically, the Statement of Principles regarding collective bargaining by professional employees, as recently adopted by NSPE's Board of Directors, is reprinted in full below.

"1. It is definitely unprofessional for a professional engineer, professionally employed, VOLUNTARILY to join a heterogeneous labor union, dominated by, or obligated to, nonprofessional groups. As stated by the Society, through its Board of Directors at Oklahoma City in September 1948, 'The individual responsibility and independent judgment required of a Professional Engineer are incompatible with the regimentation fundamentally inherent in unionization.'

"Nothing in this statement of principle shall be construed as a criticism of engineers who may be forced to join a labor union, against their will, but engineers in this predicament should seek to extricate themselves by due process of law.

"Nothing in this statement of principle shall be construed as a criticism of engineers-in-training, who voluntarily join a labor union when, as a step in their practical engineering training, they are temporarily employed in nonprofessional or subprofessional work, where their fellow workers are organized. When promoted to professional responsibilities, however, the engineer cannot continue his labor union affiliations without sacrifice of professional status.

"2. Organizations of professional engineers for collective bargaining, in any form are to be deplored, although their existence, for the present, may be condoned under certain circumstances.

"When engineers are treated collectively by an employer they may be compelled to deal with him on the same basis. Employers should appreciate that engineers have individual capacities and talents which should be considered on an individual basis, that the compensation of an engineer should be in proportion to the value of his services and not based on his age, his degrees, or any other yardstick that can be applied collectively, and that an engineer's working conditions should conform to the nature of his work rather than to any general pattern applicable to employees engaged in routine tasks that are subject to standardization.

"When employers generally are persuaded that professional employees must be viewed as individuals and not in groups or classes, then NSPE may condemn collective bargaining by professional engineers, without qualification. In the meantime, we advise the young engineer that the existence of collective bargaining by professional engineers in an industry jeopardizes his professional status. Either the employer fails to appreciate the professional nature of his engineers' work, or the employees themselves are not adhering to professional concepts. Therefore, professional engineers and engineers-in-training should not seek employment where professional engineers, professionally employed, bargain collectively."

Four of Five Engineering Grads Placed

Within three weeks of their commencement, four out of five engineers graduated this June in the largest class in the history of engineering education in America have accepted jobs or received job offers, members of the American Society for Engineering Education meeting at the University of Washington were told.

"It is clear that our country can still absorb a very large number of engineering graduates," M. M. Boring of General Electric Company, chairman of the Manpower Survey Committee of the Engineers' Joint Council and member of the New York SSPE, said. "There is much evidence that, if we have a small enrollment in the freshmen classes entering from high schools this fall, we will very clearly face a serious shortage of engineering graduates four years from now."

Mr. Boring's report was based on a telegraphic survey of 117 engineering colleges throughout the country conducted by the Manpower Committee of the American Society for Engineering Education, under the chairmanship of Dean L. M. K. Boelter, of the University of California at Los Angeles. The results showed that 62.5 per cent of all engineering graduates this year were placed by June 18 and an estimated 20 per cent more had received job offers but as yet had made no commitments.

A similar survey in 1949 showed that 62 per cent of the graduating seniors were placed by July 1 of that year. Then placement continued throughout the summer months and by November nearly 95 per cent of the previous June graduates reported placement. Many others presumably failed to report jobs which they had accepted.

"Many small industries," Mr. Boring pointed out, "are taking advantage of their opportunity to obtain sound engineering assistance by employing men from this year's class. A number of new firms have come into the recruiting field," he said.

Mr. Boring emphasized that the anticipated shortage of jobs for engineering graduates has not materialized. Especially during the last month, placement officers have reported a sharp up-turn in the demand for the present senior class. It is now assured, he said, that the number of engineering graduates placed this year will be the highest in the nation's history.

Many are entering new fields with new organizations where their engineering talents can be used to best advantage.

"Considerable publicity has been released during the past few months regarding the possibility of an oversupply of engineering graduates," Mr. Boring noted, and he deplored the effect which this has apparently had in reducing the expected enrollment of young men from high schools to the engineering colleges this fall.

He called for a reversal of this trend "so that we can properly fill our colleges with those young people who are so necessary to the welfare of our industries and of the nation."

The outlook for the 35,000 engineers who will graduate in 1951 is considered favorable. Even fewer are expected to graduate in 1952 and 1953, but there is no reason to expect declining demand if the present high level of industrial activity is maintained, A.S.E.E. officials believe.

TO THE *Editor* . . .

On July Editorial . . .

Dear Editor:

Your July issue editorial "Why Don't We Accentuate the Positive" arrested my attention at a point when I was rather upset concerning attitudes displayed and maintained by members of our own profession toward other members of the same or similar professions.

The same post delivered my copy of "Electrical Engineering" for July, official publication of A.I.E.E. I strongly recommend that everyone, whose interest has been aroused by your editorial, read President James F. Fairman's article on the subject, "Is Engineering a Profession?"

I raise the following questions:

Do our fellow engineers, regardless of specialty, recognize other engineers in the same or associated specialties in exactly the same manner and degree of respect that is accorded other professions? If not, why not?

Likewise, do we of the engineering professions try to maintain the same degree of dignity and professional position found among those of the ministry, medical and legal professions? If not, why not?

Too often we read about, witness or participate in bickering arguments among ourselves, the natural result of which is that the outsider believes we are not only unsure of our progress as a profession, but, in addition, we cannot agree or do not recognize the effort and abilities of our own fellowship.

My most recent cause for uneasiness was occasioned by a situation where an engineer of restricted education and experience called upon a man of much superior education and professional experience to render an opinion concerning a subject definitely within the realm of the latter's special field of endeavor.

The second man, after due consideration of the matter and a check with sources of current information on the subject, gave his decision with all the seriousness and degree of formality the matter at hand warranted. Was this opinion received with the same degree of respect that the first man would have accorded his minister or physician? Absolutely not. Instead, arguments and bickering followed until finally the problem was settled not on its merits, but rather on the whimsical and dubious basis of passing the buck to another agency.

I am sure that variations of the same situation mentioned above could be recited by all of us. What then, is the trouble with our kind and wherein lays the remedy?

Dealing briefly with the first question—our fellow workers do not recognize each other's standing simply because the great majority of our engineering graduates upon completion of their formal education are forced to seek employment in fields ruled by managements which have through the years accorded the engineer a status similar to that of the skilled worker rather than as individuals of distinction in an exacting field of endeavor.

In those relatively few cases where the graduate starts his career working for an engineer of experience, the older man questions the ability of even his own kind and oftentimes restricts the advancement of the new man lest there arise the possibility of the younger man supplanting him in the eyes of those for whom the senior individual works or has contact.

In the other professions we find that after the graduate has completed his post-graduate internship, apprenticeship or assistant pastorate, he then, in his own way, hangs out his shingle and, win or lose, makes further progress on the results he alone attains with the outside world.

Because of our failing we find countless numbers of men of good education operating under the peonage system of the drafting room, driven and coerced by the more ruthless members of the psuedo-science.

The answer to the second question relies entirely on an improvement in conditions affecting those presented in the first query. It is impossible for the members of the engineering profession to attain the collective respect and dignity of the other professions until we achieve a more respectful attitude among ourselves.

The remedy seems to lie entirely within our own province. When the man who heads existing utilities and large industries recognizes the fact that he cannot expect to employ good technical talent until he is willing to pay it the respect and fees such talent is worth to him; when those engineers who by some stroke of luck external to their ability as an engineer and who rise to high executive positions in our major utility companies and the industries serving them, cease to treat the less fortunate members of the profession as menials to be hired and fired by lot or gross, then and then only will the young engineer graduates of the future regard the profession with a less skeptical eye.

J. H. BURTIS
Evanston, Ill.

Dear Editor:

When I received the July issue of the AMERICAN ENGINEER I glanced through it rather hurriedly and skipped over the editorial. The thought struck me that it was worth reading again — in a more leisurely and thorough manner and I have just completed reading it twice again.

It is an excellent editorial and I especially like the thought "the public is willing to accept them (the engineers) as truly professional men any time they want to live up to the title."

I believe that you are 100% right. Perhaps we had to go through the stage in which we recognized and acknowledged our faults to ourselves, but now we surely should have reached the stage where we spend our time in correcting them and in "living up" to our profession.

That this is not always easy to do, is demonstrated by your title "Why Don't We Accentuate the Positive?" Perhaps we should leave the "Why Don't" out of the picture. Let's Accentuate the Positive.

JOHN T. WEST, JR.
Secretary,
Penna. SPE,
Harrisburg, Pa.

Plug . . .

Dear Editor:

My son, Keith Fritzsche, aged 7, Hamilton, Ohio, was recently a guest of Emil Szmyds, of Station WIKY, 820 kc, Evansville, Indiana on a children's program called "Hey Kids, Are You Listening?"

Keith was interviewed, and when asked what he wanted to be when grown he replied, "a *registered* mechanical engineer." We thought this was an excellent plug.

AL FRITZSCHE, JR.
Hamilton, Ohio

New Committee Members Prepare For Active Year Ahead

By

Sidney L. Stolte,

President, N.S.P.E.

One of the major duties it has been my pleasure to perform since becoming president of your Society on July 1, has been the appointment of new committee members. As you well know, we of the NSPE are justly proud of our democratic system of organization. Our committee setup is an integral part of this system. Through the committee chairman or member, every professional engineer in the Society is afforded an opportunity to talk or correspond with men who are concerning themselves with a particular activity. I urge all members to do so. Keep yourself informed of the work these men are doing. In a short while you will be surprised how much is being accomplished for the profession by these engineers giving so generously of themselves and their time.

Committee members are listed below and on the opposite page. These two pages can be easily separated from the remainder of the magazine and placed in your file for future reference. I think it important that the pages be retained in some fashion, for you may find them of value to you in the months ahead.

While we are talking about our NSPE "team" I should like to take this opportunity to expand the subject briefly. Another great component part of this team, is the Executive Committee. This group of truly professional men does so much to guide the destinies of our great Society, that it is impossible to encompass their accomplishments in words. Suffice it to say that I look forward with sincere anticipation to working with them, and benefiting from their wise counsel.

No talk of teamwork would be complete if we did not extoll the work of our excellent directive group, the Board of Directors. With one or more representing every member state, the director is closest of all to the "grass roots." He is a man whose name you should know. He is a man whose work you should make it your business to follow. Now, we know it is physically impossible for every member to contact his director personally, but that does not mean that your opinions must never reach him. Far from it. By discussing your problems at the chapter level, and informing your State Society of your wishes, the director will come to know of your feelings. He in turn, then, carries the message to the National meetings, where all may hear and discuss and act.

So we enter another administrative year. I feel my team is ready to do its job. And ready it must be if it is to equal the brilliant accomplishments of our past.

Sincerely,

SIDNEY L. STOLTE

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Special Representative to Committee on Unity of the Engineering Profession: Alex Van Praag, Jr., Illinois; 253 South Park St., Decatur, Illinois.

Special Representative to the American Standards Association: Richard L. Higgins, c/o Department of Labor, 1 Exchange Place, Jersey City 1, New Jersey.

Special Representative to the Engineers' Joint Council Committee on Surveys: William H. Larkin, 50 Ausable Ave., Staten Island 1, New York.

Special Representative to the Advisory Committee NCSBEE National Bureau of Registration: Walter Graf, City Hall, Lancaster, Ohio.

Special Representative to (1) Building Officials Foundation; (2) U. S. Chamber of Commerce—Construction Industry Advisory Council: Ritchie Lawrie, Jr., Pennsylvania; 321 North Front St., Harrisburg, Pennsylvania.

BOOK LOOKS

Title of Book: Engineering Economic Analyst.
Author: Clarence E. Bullinger.
Published by: McGraw-Hill. Price, $4.00.

A new edition of a text that shows the engineer what the economic factors are that may be present in any engineering project, shows him how to evaluate them and get estimated costs, then to separate and define the intangible factors that are associated with the project, and finally suggests methods and problems inherent in the financing of the project. Material has been clarified and brought up to date, and new chapters added.

Title of Book: How to Run a Meeting.
Author: Edward J. Hegarty.
Published by: McGraw-Hill. Price, $2.50.

Gives tested suggestions for making any club, association, committee or other type of organizational meeting an outstanding success. Based on the author's thirty years' experience dealing with groups, the volume contains hundreds of helpful ideas and pointers for planning and conducting meetings—from getting out the members to holding their interest—from putting pep into meetings to handling disturbances—from holding resultful discussions to arranging the entertainment.

Title of Book: Engineering Organization and Methods.
Author: James E. Thompson.
Published by: McGraw-Hill. Price, $4.00.

Presents a specific plan for organizing and operating product-design engineering departments—based upon departmental functions, and proven by successful application in a wide variety of industrial concerns. The methods described are basic, and applicable to most engineering departments. The reader will gain an understanding of the fundamentals of organizing, operating, and controlling an engineering department, and detailed instructions for the application of these fundamentals.

Title of Book: Legal Phases of Engineering.
Author: Ivan C. Crawford.
Published by: The MacMillan Company, New York. Price, $3.75.

No excavation is dug, no foundation laid or structure erected, without legal questions being raised. The answers to many of these questions are made conveniently accessible in Dean Crawford's book. The contractor—the person or firm who, for a consideration, engages to take the risks involved and to carry through an engineering project — occupies a commanding place in the business life of the United States, the author points out. Every move, it is emphasized, a contractor makes has legal implications.

Here in one volume is a clear and concise summary of the legal problems which are part of the daily business experience of members of the engineering profession. Stressing the vital importance of clear and explicit contracts and specifications, it provides case studies of basic points of law affecting engineers, as well as numerous examples of contracts, agreements, performance bans, and specifications.

Title of Book: Speaking Can Be Easy—For Engineers.
Published by: Engineers Consul for Professional Development, 29 West 39th Street, New York 18, New York. Price, 50 cents.

This practical pocket-size manual was written by experienced engineering speakers especially for the engineer. It was prepared by the Committee on Relations With Industry for the American Engineering Society on Education.

Speaking Can Be Easy—For Engineers can be read through in 30 minutes. Illustrations in a humorous vein appear on each spread to emphasize major points. Effective organizing of the text enables the reader to cover the most important points throughout the manual in only five minutes. Check list for both the speaker and the meeting chairman provide help for the improved execution of their respective responsibilities.

In "The Speaker" section the following subjects will be found of particular value: What type of Speech?, Planning and preparing, Attention patterns, Platform Manners, and Microphone Technique. Of special interest to the chairman is "The Meeting" section with its treatment of effective introductions, starting and ending questions, assuring a bigger and better audience.

The sections "How can I improve," "Background for Better Speeches" include 12 carefully selected references for further help on the various phases of speech psychology for effective speaking.

Title of Book: Patterns of Cooperation.
Published by: Department of State, Division of Publications, Office of Public Affairs, Washington, D. C.

It is the purpose of this volume to survey the whole field of International Economic and Social Cooperation and to appraise the work of the specialized agencies in other inter-governmental organizations to which the U. S. belongs. This book is a record of organizations whose purpose is the advancing of the economic interests and social well being of the American people. If some of their contributions are direct, in that they affect our daily lives in the U. S.; others are indirect, in that they add to our security and welfare by raising standards of living, improving social conditions, and safeguarding freedom elsewhere in the world.

No attempt is made in the volume to catalogue the purposes of achievement of every individual organization of which the United States is a member. Attention is focused on the major achievements in the principal fields of economics of social activity.

Title of Book: Strengthening the Forces of Freedom.
Published by: Department of State, U. S. Printing Office, Washington, D. C. Price, 50 cents.

This volume includes selected speeches and statements of our highly controversial Secretary of State, Dean Acheson. Anyone interested in this colorful public servant's career, or in America's complex foreign policies, will find the book most intriguing.

Title of Book: Public Relations in the Local Community.
Author: Lewis B. Lundborg.
Published by: Harper Bros., New York. Price, $3.00.

Mr. Lundborg does a good job in this well written book explaining the workings of public relations at the community level.

Other Recently Published Books

FIRE PROTECTIONS THROUGH MODERN BUILDING CODES. *By B. L. Wood.* Published by American Iron and Steel Institute, 350 Fifth Avenue, New York 1, New York.

DESIGNS FOR HELICOPTERS. *By I. B. Laskowitz.* Published by the author, 284 Eastern Parkway, Brooklyn 25, New York.

MUNICIPAL AND RURAL SANITATION. *By Victor M. Eihlers and Ernest W. Steele.* McGraw-Hill Book Company, New York. Price $6.50.

Accent on Activity

YOU MAY RECEIVE AMERICAN ENGINEER READERSHIP-PRODUCT SURVEY THROUGH MAILS SOON. If you get the long white card please answer the questions **AND DROP IN MAIL AT ONCE.** Cross section of subscribers sent survey. Results will be used to help sell AE advertising — will answer questions about readership interest in mag and products readers buy or specify. **SURVEY ANOTHER STEP IN DRIVE TO GET ADVERTISING FOR AE in '51.**

FUND RAISING CAMPAIGN FOR PUBLIC RELATIONS PROGRAM is moving past planning stage. Executive Director Robbins will discuss campaign with Public Relations Committee head C. G. Roush, when he goes west to address Missouri School of Mines engineering grads at Rolla. **CAMPAIGN SHOULD BE READY TO GO BY EARLY FALL.**

NEW COMMITTEES AT WORK. (See pages 18 and 19) **Recent Conference:** President S. L. Stolte and Publications Committee head George J. Nicastro talked things over with Executive Director Robbins and AE staff . . . **COMMITTEE CONFERENCES COMING UP:** Legislative Committee head Clarence Shoch will confer with NSPE Staff on committee activities as will Jack J. Hinman, National Defense Committee chief.

KOREAN AFFAIR has dictated intensified liaison by NSPE Hqs. with Defense Department and National Security Resources Board re: Utilization of engineers in civil defense and military affairs.

AT NSPE HQS. IN WASHINGTON: President Stolte and Executive Director Robbins confer with **WHITE HOUSE** regarding appointments for important National Science Foundation . . . **American Medical Association officials, during talk with NSPE heads, express great interest in resolution passed by NSPE Board in Boston re:** socializing professional services. **MORE MEETINGS COMING** between State Medical Associations and NSPE State Societies. **THIS MEANS INTER-PROFESSIONAL RELATIONSHIPS ARE BEING CEMENTED.**

ON THE LEGISLATIVE FRONT: Many requests coming into Washington office concerning engineering and employment consultation services under **POINT FOUR PROGRAM.** Members being advised that appropriation for program not yet available and that employment and consulting services will be handled by **individual government agencies affected . . . LEGISLATIVE BULLETIN continues to do outstanding job. PROOF:** Notice in Bulletin announcing availability of new government reports on Water Pollution Control & Wage Hour Law resulted in a demand that soon exhausted NSPE supply. Same story on Atomic Energy program report.

IMPORTANT STATEMENT OF PRINCIPLES RE: COLLECTIVE BARGAINING, as adopted by Board of Directors at Boston, has been sent to all chapters and state societies. **ALSO** to editors of leading engineering publications and other interested organizations. **Statement should be given wide publicity at chapter level . . . ATTENTION CONSULTING ENGINEERS:** Standard **form of agreement** between engineer and client has been reprinted. Ample supply now available. TAKE ADVANTAGE OF THIS SERVICE . . . **ALSO AVAILABLE FOR THE ASKING: Statement of Principles covering Competitive Bidding.**

MORE BUSINESS THAN EVER COMPLETED AT RECENT BOSTON MEET. Result: minutes that run 41 pages. Each State Society has received copies of minutes for distribution to chapters. **MEMBERS SHOULD REVIEW CHAPTER COPY for complete picture of Society and profession status.**

NEXT BOARD OF DIRECTORS' CONFERENCE NOW DEFINITE. Place: Little Rock, Ark. **Time:** November 3 & 4, 1950. **'51 Board Meeting & State Presidents' confab set for Washington, D. C., March 1, 2, 3, '51.**

Around The Nation With Our Members

Northern Va. Chapter Launches Publication

The Northern Virginia Chapter of the Virginia Society of Professional Engineers is now publishing a new publication entitled The Professional Engineer's News.

The mimeographed News Letter will be issued monthly, and will carry news concerning the Northern Virginia Chapter and other units of NSPE.

New Jersey Society To Study Truck Overloading

The New Jersey SPE's Board of Trustees Meeting was held recently at Absecon, New Jersey.

Among other important business transacted was the establishment of a special committee to study the possible impact of truck overloading on N. J. highways and bridges. The committee is headed by Col. Leonard C. Urquhart.

The committee will (1) study the findings and data of the Highway Dept.; (2) study the findings and data of the truck-owners association; (3) study the findings and data of the United States Department of Public Roads.

Idaho Society Meets; To Aid Educators

Members of the Idaho Society of Professional Engineers and many student guests recently completed a statewide meeting held at the State University in Moscow.

After completing business sessions during the day, an excellent dinner was held in the evening. Mr. Leonard E. Johnston, manager AEC operations in Idaho, spoke to the group. He encouraged more specializing in "nuclear engineering," and then described the plan of operations in Idaho of the AEC.

Another highlight of the meeting was the approval of a motion to write superintendents of Idaho high schools enclosing Idaho Society of Professional Engineers membership lists, and offering to help officials in furthering vocational guidance programs by furnishing professional men to explain the engineering profession.

Ohio Functional Groups Organize

The Highway, Private Practice and Industry groups have put into effect the new By-Laws of the Ohio SPE relative to Functional Groups. The Municipal Group expects to complete their election later.

The new by-laws adopted by the Board of Trustees on March 16, gave these groups the privilege of having an executive committee of 6 officers to carry on their business between annual meetings. The officers designated were a chairman, 4 vice-chairmen and a secretary-treasurer.

The Highway group elected Robert Fisher, Miami, as chairman, Hal Krauser. Southern Ohio, Ross Schultz, Toledo, Walter Moulton, Akron, and Ferd Robb, Central Ohio, as vice-chairmen with Joseph Unger, Dayton, as secretary-treasurer.

The Industry group elected Arthur B. Heiberg, Akron, chairman, T. F. Hindman, Cleveland, George E. Spengler, Cincinnati, James D. Brown, Toledo, and Benjamin Eisner, Columbus as vice-chairmen, with Otto E. Sords, Akron, as secretary-treasurer.

The Private Practice group elected T. B. Henry, Toledo, chairman, Paul Dumond, Central Ohio, John M. Schweiger, Dayton, Arthur E. Rowe, Cleveland, and Carlton S. Finkbeiner, Toledo, as vice-chairmen, with Myron T. Jones, Columbus, as secretary-treasurer.

The Municipal group elected William H. Brabson, Dayton, as chairman and Edwin L. Pollard, Dayton as secretary-treasurer. The four vice-chairmen are to be chosen later. The Public Utilities group retained their same officers, Wayne R. Deimel, Columbus, as chairman and L. T. Hunziker, Columbus, as secretary-treasurer. The County group had no election, leaving John M. Stough, Columbus, president of the County Engineers Association as their acting chairman.

Hudson County Group Hear Time Study Talk

The regular monthly meeting of the Professional Engineer's Society of Hudson County, New Jersey Society of Professional Engineers was held recently at Hoboken, with president Eugene Koenik presiding.

The speaker for the evening was Phil Collins a member of the Essex County Chapter and a number of other engineering societies. His topic was "A Fair Day's Work." The talk concerned time study as applied to incentive.

Collins stated that both labor and management are both skeptical when time study proposals are brought before them. Despite the skepticism, however, Collins said over 140 companies have installed his system.

Mineral Wells Chosen For Annual Convention

Mineral Wells was chosen as site for the 1951 annual convention of TSPE by the executive board in a meeting at the Stephen F. Austin hotel.

The board also voted to establish a military affairs committee to become better informed on the increased importance of military needs. Work toward establishment of the week of January 20, 1951, as National Engineers Week in Texas will be undertaken.

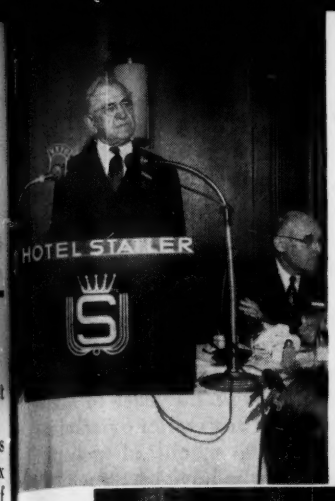
The executive body discussed its work in promoting registration of all professional engineers under the state's registration law.

President Mason Lockwood of Houston was in charge. Vice-presidents are Marvin Nichols of Fort Worth and Henry Mathieu of Pampa.

Texas State Board Of Registration Honored

The Dallas Chapter, TSPE, held one of its most profitable and enjoyable meetings recently with the entire membership of the State Board of Registration for Professional Engineers as honor guests. The Board held a business session in Dallas during the day and remained for the Chapter meeting. After the social hour and dinner, the speaker of the evening and member of the Board, John H. Murrell, of Dallas, was introduced by Louis B. Blaylock, chairman of the Chapter Activities Committee. Mr. Murrell's subject was "What is the Matter with Engineers?" He urged

(*Continued on page* 28)



John Charles Riedel, P.E., past-president of NYSSPE, past-president of NSPE, and a Trustee of NYSSPE, introduces Mayor O'Dwyer.

Mayor O'Dwyer of N.Y.C. speaks.

President George J. Nicastro, P.E., of NYSSPE presents President-elect Robert A. Sovik, P.E., with a suitably inscribed gavel.

Rear Admiral Joseph F. Jelley, Jr., Chief, Bureau of Docks & Yards, U. S. Navy, addresses the Annual Membership Luncheon.

Zone Director Carl L. Zamjohn, P.E., of Utica, delivering the presentation address.

NYSSPE HOLDS MID-CENTURY MEET

The Mid-Century convention of the NYSSPE was held recently in New York City in conjunction with the Engineering Industries Exposition. The Exposition netted the Empire State Society a substantial profit, making the convention a financial as well as a fraternal success.

Highlights of the gathering included the presentation to outgoing President George J. Nicastro, P.E., of a silver plate engraved with the signatures of the members of the 1949-50 Executive Committee, and suitably inscribed to commemorate President Nicastro's chairmanship of this policy committee of the State Society.

Robert A. Sovik. P.E.. is the new president.

David B. Steinman, Ph.D., P.E., Chairman of the Board of Trustees, NYSSPE, presents Charters to the five new chapters established in New York State during the past twelve months. Left to right: D. B. Steinman, Ph.D., P.E.; W. E. Roubie, P.E., president Jefferson-Lewis Chapter; R. R. Jermano, P.E., president St. Lawrence-Franklin Chapter; E. S. B. Pitkin, P.E., president Champlain Valley Chapter; Charles L. Vogt, vice president Ulster Chapter; and W. W. Perry, P.E., Chairman of the Extension Committee, NYSSPE, who accepted the Charter on behalf of the newly formed Tompkins Chapter. President Nicastro, NYSSPE, looks on. In the photo on the right is the gathering of the presidents: NSPE President Sidney L. Stolte, P.E., confers with President Clarence T. Shoch of Pennsylvania to his right, while to his left President George J. Nicastro, P.E., of New York and President Reed of Connecticut look on, prior to the annual membership luncheon of NYSSPE.

Above, l. to r., are Allan H. Kidder, P.E., Vice President of the Philadelphia Chapter, and Chairman, Scholarship Committee; Mrs. John A. Westenberger, mother of the scholarship winner; John, and William A. Toperzer, P.E., President, Philadelphia Chapter.

Philadelphia Chapter Awards Scholarship To Honor Student

At the commencement exercises of Lansdowne, Pa., High School (a suburb of Philadelphia), John Andrew Westenberger was granted a five-year engineering scholarship by the Philadelphia Chapter, PSPE. He will enroll in the Mechanical Engineering course at Drexel Institute of Technology.

Mr. Westenberger is Drexel's No. 1 choice in a field of 156 candidates. He is an honor student in his class, graduating with an average of "A" each year for four years. He is an accomplished baseball player, having won his letter in his Junior year, and a proficient public speaker, in recognition of which he received the Public Speaking Award. Two other awards were bestowed upon him.

The Philadelphia Chapter is the first in the Pennsylvania Society to sponsor an engineering scholarship and probably the first Chapter in the National Society to grant one for a full engineering course.

After months of effort on the part of the Scholarship Committee, a workable plan for the granting of a scholarship to a worthy student was approved by the membership at its annual meeting in May.

Briefly, the plan covers a five-year grant of tuition and fees for a course in engineering at Drexel Institute of Technology or University of Pennsylvania. The cooperating institution is granted wide latitude in the selection of the candidate so long as it observes the following factors in the approximate order listed: character, personality, scholarship and need.

The course selected by the candidate must be one which will train him to qualify for registration as a professional engineer and for active membership.

Drexel Institute of Technology was selected as the initial cooperating institution and they were advised to submit the name of a candidate meeting all of our requirements with this addition—that he be an exceptional candidate. This Drexel did and the recommended candidate was approved.

Carroll of NSPE Named ASME Fellow

The election of six members of the ASME to the grade of Fellow was announced recently by the Society's headquarters in New York City. Among those named was Phil Carroll, a member of NSPE and a consulting engineer from New Jersey.

Engineers with acknowledged engineering attainment, 25 years of active practice in the profession or teaching experience in a school of accepted standing, and who have been members of the society for 13 years, are eligible for the honor.

Promotion to the grade of Fellow is by election of the Council, supreme governing body of the society, upon nomination by five Fellows or members of ASME. In addition to Carroll, the newly-elected Fellows are:

Sydney Dillon, chief engineer until his retirement, Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.; Ralph E. Hall, director, Hall Laboratories, Inc., Pittsburgh, Pa.; Isaac Harter, chairman of the board, The Babcock & Wilcox Tube Company, Beaver Falls, Pa.; Marcello A. King, vice-president in charge of engineering, Elliott Company, Jeannette, Pa; and Burgess Hill Jennings, chairman of the department of mechanical engineering at Northwestern University, and engineering consultant to the Argonne National Laboratory.

Chamber of Commerce Urges Hoover Reforms

The Board of Directors of the Chamber of Commerce of the United States has approved a statement urging immediate Congressional action on Hoover Commission bills to reorganize the federal personnel system and the Post Office Department.

The statement pointed out that Congress is preparing to adjourn without having acted on any important Hoover Commission bills this year.

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Employment In Industry, Commerce, Continues To Rise

Employment in industrial and commercial establishments rose by 330,000 between April and May, reaching the highest level attained in 1950, Maurice J. Tobin, Secretary of Labor has announced. The uninterrupted climb in the number of employed persons has added more than 1.5 million workers to pay rolls since February, the low point of this year. The May figure of 43.2 million represents an increase of 455,000 over May 1949. The April-May increase reflects substantial gains in construction and manufacturing.

Employment in manufacturing showed a net gain of 171,000 between April and May, of which slightly more than half was due directly or indirectly to the settlement of the labor dispute in the automobile industry. The May level of 14.3 million manufacturing employees was nearly 570,000 workers above July 1949, the low point in last year's activity. The rising volume of industrial production is also reflected in the lengthened workweek, from 38.8 hours in July 1949 to 39.9 in May 1950.

The current high level of manufacturing employment is largely attributable to gains in the durable goods industries, which have expanded steadily since the steel strike was settled in November 1949. Between April and May 1950, nearly 200,000 workers were added to the pay roll, a gain in which virtually every hard goods industry participated.

Reflecting the current high level of building activity, employment in contract construction rose to 2,243,000 in May, an increase of 178,000 over the previous month and 106,000 above May 1949. The April-May increase was the largest to occur between those 2 months in any year since 1942.

Little change in employment occurred in the other industry divisions. Modest gains were recorded in finance and service and minor declines in mining, transportation, trade, and government.

Unemployment in May dropped to less than 3.1 million according to the Bureau of the Census. This represents a decrease of nearly half a million from the previous month and a drop of 1.6 million from the postwar peak of 4.7 million in February 1950. May was the first month in 1950 in which unemployment was lower than in the same month of 1949.

FRANKLIN COUNTY AND TOLEDO CHAPTERS, OSPE, HOLD PRESENTATION AFFAIRS

Two Registration Certificate Presentation meetings—one at Columbus, Ohio, held by the Franklin County Chapter, OSPE, and the other sponsored by the Toledo Chapter and held in that city—were outstanding successes, officials announced.

In the pictures above, taken at the Franklin County meet, are shown J. H. Bronson, H. A. Wilbur, T. B. Ragland of the Chapter, and Loring T. Hunzlker, President of the group. The inset shows H. A. Wilbur, the man highest in the electrical engineering exams, receiving his certificate from Robert N. Waid, Past-President of OSPE (1922). Directly above is a general view of the banquet, showing part of the 200 to attend the gathering.

Toledo Chapter photos are shown below.

In the photo on the left, Mr. B. G. Kesting, Vice Chairman of the Board of Registration for Professional Engineers and Surveyors, presents one of the newly registered men with his certificate. On the right is a partial view of the more than 120 present for the occasion.

Central Ill. Chapter Compiles List

At the request of the Executive Committee, Illinois Society of Professional Engineers, the Central Illinois Chapter is asking all of its members who are qualified and capable of designing dams and the development of proposed recreational lakes in Illinois, and who are interested in being retained for such engineering work, to notify the Chapter Headquarters.

John F. Sweetnam, Chairman of the Ethic and Practices Committee, is directing the project.

Monroe County Group Hold Social Meet

The Monroe County Chapter, New York State Society of Professional Engineers, held a social meeting recently in Rochester, New York.

Harold A. Mosher, is the new president of the Monroe County group.

Milwaukee Members Hear Writer

The Milwaukee Chapter, Wisconsin SPE, recently held a banquet in Milwaukee.

After dinner the group heard a speech entitled "Europe As I See It" by Miss Annette Snapper, one of America's popular inquiring reporters.

Rhode Island Prints State's First Fee Book

The Rhode Island Society of Professional Engineers has announced that its recommended Fees and Salaries for Professional Engineers booklet has now been published.

The booklet is the first fees and salaries schedule to be published in the state.

Calif. Society Issues New Magazine

A new quarterly magazine has been initiated by the California Society of Professional Engineers.

The magazine, a six-by-nine size publication, is NSPE's newest state magazine. As pointed out in the editorial, the organ will serve to "coordinate the affairs of the society and assist in creating its more efficiation function."

Fill Out Coupon To Get Your Firm On New NSPE List

The national headquarters of NSPE in Washington, D. C. is constantly receiving requests for the names of firms doing work in various fields of engineering. These are sometimes requested by locality, types of work, or specific problems involved.

To benefit our members, and to be of service to commercial organizations and government agencies in search of data, NSPE is attempting to set up a roster of engineering firms. The coupon below will supply all the information needed. If you would like your firm to be listed on the NSPE Roster of Engineering Firms, fill out the coupon below and MAIL IMMEDIATELY to NSPE 1121 15th St., N.W., Washington, D. C.

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The Bridge

By

Dr. D. B. Steinman

Editor's Note: Below is a poem written by Dr. D. B. Steinman, internationally known bridge engineer, and first president of NSPE.

In days gone by, a valiant band,
With consecrated heart and hand,
Set out as pilgrims, seeking ways
To pierce the wilderness of fear,
To bring the distant places near.
To build new roads to brighter days.

Through field and forest, hill and vale,
They cleared a path and blazed a trail.
In heat and frost, they toiled each day
To make more smooth and safe the road,
To ease the heartache and the load,
For others who would come that way.

One night the pilgrims reached the rim
Of canyon deep and torrent grim,
With alien tribes on farther side.
The need was clear—a mighty span,
A link of peace uniting Man,
Built high above the swollen tide.

The pilgrims built a bridge of wood:
In massive strength the great span stood.
But ere the bridge with load was strained,
A fiery spark fell on the span
And flames consumed this work of Man—
Then naught but glowing ash remained.

The pilgrims labored to atone:
This time they built a bridge of stone.
But ere the builders' thrill had waned,
A sudden earthquake heaved the ground
And felled the bridge, with crashing sound—
Then naught but rubble heap remained.

Imbued with unabated zeal,
The pilgrims built a bridge of steel.
But as their eyes aloft were trained,
A thing of terror, hurtling past,
Dissolved the bridge in fission blast—
Then naught but vapor glow remained.

The pilgrims now were sad of heart.
Their best was spent of skill and art.
Yet all their work had come to naught.
What part was missing in their plan?
How could they build a lasting span
To reach the goal their toil had sought?

While hearts were heavy with despair,
There came an answer to their prayer.
As clouds rolled back before their gaze,
A radiant vision met their eyes—
A rainbow span across the skies,
Resplendent in its glowing rays.

And as they gazed with wonder high.
They heard a Voice speak from the sky:
"To span the gap from man to man,
Construct a bridge not made by hands.
Not wood or stone or iron bands—
Of Human Kindness build the span!"

The pilgrims' hearts with hope were fired;
With prayer they turned to task inspired:
By overcoming human blindness,
By giving loving thought to others,
By treating all men as their brothers,
They built the Bridge of Human Kindness.

And there the Span of Spirit stood,
Conjoining men in brotherhood,
Uniting men in love supernal.
Fierce storms may rage and lightning flash,
Wild floods may swirl and earthquakes crash—
But naught can shake the Span Eternal.

The Span thus built of priceless parts—
Of Love Divine in human hearts—
Has strength no evil force can sever.
The dream of Heaven-inspired sages,
The prayer of mankind through the ages—
The Bridge of Kindness lasts forever.

Erie County Meets

Above are photos taken at a recent meeting of the Erie County Chapter NYSSPE, which was attended by more than 110 members. In the top picture are shown, l. to r.: Charles R. Waters, First President of Erie Chapter and District Engineer, N.Y.S. Highway Department; William E. S. Dyer, newly installed First Vice President, Erie Chapter; C. Arnold Dutton, newly installed President, Erie Chapter; Edwin S. Bundy, newly installed 2nd Vice President; Edward J. Nunan, recently installed N.Y.S.S.P.E. 2nd Vice President and Past President, Erie Chapter. The center photo was taken as Master of Ceremonies E. J. Nunan presents wrist watch to retiring 20-year Chapter Treasurer, Arthur B. Weaver, from all the Past Presidents. Weaver has served as Treasurer since the founding of the Erie Chapter. Bottom: Newly elected Erie County Chapter officers and directors for 1950-51. Seated l. to r.: William E. S. Dyer, 1st Vice President; C. Arnold Dutton, President; Charles R. Waters, for Edwin S. Bundy, 2nd Vice President. Standing, l. to r.: Elmer G. H. Youngman, Director; Howard F. Stimm, Director; Richard C. Wohler, Treasurer; H. Dale Bossert, Director; F. Brendon Burke, Corresponding Secretary; and Carlos H. Frank, Recording Secretary.

Around the Nation

(*Continued from page* 22)

engineers to become business men and to promote public relations if they want more recognition and more money.

At the conclusion of Mr. Murrell's address he yielded the floor to Carl L. Svenson, Secretary of the Board. Mr. Svenson conducted a forum discussion on the problems of registration and enforcement. The Junior members, especially, were interested and asked many questions which Mr. Svenson answered, explaining in detail the Engineer-in-training policies of the Board.

Illinois Society To Hire Legislative Analyst

The Illinois Society of Professional Engineers has set up a budget of $8,000 to be raised from contributions among ISPE members, for use in the employement of a Legislative Analyst. The Analyst would be hired to represent the Society during the forthcoming Biennium session of the state Legislature.

Charter Members whose annual income is less than $5,000 will be asked to contribute $5.00 each. The members whose annual income is $5,000 or more, will be asked to give $10.00 toward the fund.

It was pointed out by Illinois officials that employing the services of a Legislative Analyst will insure the profession of a strong voice in legislature matters.

Morgantown Chapter Discusses EIT Exams

The regular monthly meeting of the Morgantown Chapter, West Va. SPE, was held recently at Morgantown.

The speaker, Mr. John Oberly, Construction Engineer, Portland Cement Association, presented a very interesting illustrated lecture on "Architectural Concrete." A short discussion was held after the talk.

President Corson opened the business session by asking for a reading of the minutes of the April 18 meeting. Under new business, Dean R. P. Davis commented on correspondence he has had with President O. M. Jones, of the State Registration Board for Professional Engineers and Ross B. Johnston, Secretary of West Virginia Society of Professional Engineers, regarding examinations for engineers in training at the time of graduation. A lively discussion followed. It was finally recommended that these two men be invited to speak at the regular meeting of the chapter in September.

A motion was made and seconded that the secretary send a copy of the list of potential members received from the state office to each member of the chapter with a letter from the membership committee asking them to contact at least one member on this list. The motion carried.

St. Clair Group Hear Chemist

A recent dinner meeting of the St. Clair Chapter of Illinois Society of Professional Engineers was held at East St. Louis, Illinois.

President S. C. Casteel called the meeting to order. Minutes of the last meeting were read and approved. The Secretary then gave his report on the President's, Secretary's, and Membership Chairman's meeting at Champaign recently.

Dr. Thomas F. McDonald, director of chemical engineers and plant development at the C. K. Williams Company was then introduced by President Casteel. Dr. McDonald talked on recent developments of pigments and their application in protective coatings.

Daytona Beach Chapter To Review Telephone Listings

The Daytona Beach Chapter recently held a joint dinner meeting with the ladies' auxiliary of the chapter. The occasion gave those interested in the chapter a most valuable opportunity to become better acquainted, which resulted in a pleasant and successful evening.

At another recent meeting held in Daytona Beach, the Chapter adopted a resolution, proposed by President Moreau Bostwick and directed to the Southern Bell Telephone and Telegraph Company, offering the services of the chapter to the Company in checking and correcting its classified telephone directory listings.

President Bostwick and Joe Williamson, Jr., were delegated to study the possibility of the chapter providing an engineer advisor to the Daytona Beach planning board. The chapter initiated action to arrange that some future meetings be held in either Orlando or Sanford for the convenience of members in that part of the Chapter area. The Chapter also voted to recommend to the FSPE that manufacturers and firms be sold exhibit space at annual conventions.

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Florida County Engineers Must Be Registered

The following opinion was recently rendered by Richard W. Ervin, Attorney General for the state of Florida, in answer to the following question: "Must a county engineer be a registered professional engineer under the provisions of Chapter 471, Florida Statutes?" "471.01 Purposes.—It is hereby declared to be the public policy of the State of Florida, that, in order to *safeguard the life, health, property and public welfare of her citizens,* and persons hereafter practicing or offering to practice professional engineering in Florida, as hereinafter defined, shall be required to submit evidence sufficient to convince the Florida state board of engineer examiners that he is qualified to practice professional engineering, after which he shall be registered as hereinafter provided."

Tulsa Auxiliary Stages Fashion Show

A fashion show was featured at a guest day tea given by the Auxiliary to the Tulsa Chapter O.S.P.E. recently. About two hundred members and guests attended to view the summer styles shown by Clarke's and modeled by members of the auxiliary. Mrs. Percy Blair was in charge of the show. Models were the Mesdames G. R. Childress, Claude H. Dyer, Rexford L. Lane, R. W. Winget, J. E. Perry, A. B. Richert, N. P. Whaley, Jr., Clyde Wyant, J. Ray Polston, C. P. Stanley, J. Linden Kezeler and E. J. Handley.

Receiving the guests were new officers and committee chairmen of the auxiliary and past-president Mrs. Floyd Zook. Mrs. Glenver McConnell, tea chairman, was assited by Mrs. J. Ray Polston, Mrs. C. P. Stanley, Mrs. L. Linden Kezeler, Mrs. L. A. Boyd and Mrs. Clyde F. Mooney.

Special guests were wives of mem-

bers of the Tulsa Engineers Club and wives of O.S.P.E. members from other districts. The Oklahoma City Auxiliary was represented by Mrs. J. S. Waldrep, past-president of the group; Mrs. Robert McDowell, president; Mrs. Mark Hargis and Mrs. William Dale, executive board member.

Woman Engineer, Detroit Member, Retires

Miss Hazel I. Quick, member of the Detroit Chapter, MSPE, has retired from business after 33 years as the only woman engineer for the Michigan Bell Telephone Company.

Raised in a lumber camp in Northern Michigan, Miss Quick went mechanical at an age when other youngsters were playing house and dressing dolls.

She was accepted in the University of Michigan's Engineering School—the only woman in her freshman class.

After receiving her degree in Civil Engineering in 1915, Miss Quick did estimate work for professors who then conducted private contracting businesses on the side.

Her experience led her to Michigan Bell two years later, where she launched cost and wage studies, and made numerous surveys relating to the conversion of central offices from manual to dial operation.

She was awarded a life-time membership in the Telephone Pioneers of America, an organization comprised of those with 21 or more years of telephone experience.

Kings County Host To All PE's and EIT's

The Kings County Chapter of the NYSSPE sponsored a reception recently for all P.E.'s and E.I.T.'s in Kings County.

1st Vice-President Charles W. Mitchell, who is President of the Kings County Chapter, presided. Our President Leslie Wax, Chairman of the Chapter Membership Committee, Past President John C. Riedel, Treasurer Murray Harris, Paul Klepper and C. W. Valentine were also present to assist in greeting the guests and supplying them with information and NYS SPE membership applications.

Editor H. H. Funk of the N. Y. Professional Engineer magazine and Executive Secretary Reed of the State Society spoke at some length on the advantages to the licensed P.E. of membership in the organization. About 70 were present and to date Kings County Chapter has added about 30 members as a direct result of this reception. The total membership in the Chapter is now over 300.

San Jacinto Chapter Hears Woolrich

Interested in the membership drive of TSPE, the San Jacinto chapter commended the good work done by this committee in their June meeting. Invitations were sent to engineering graduates in the entire Southwest area to attend this meeting and a fine attendance was recorded.

On hand to discuss "How a Professional Attitude Can Be Instilled in Engineering Students" was Dean W. R. Woolrich of the University of Texas. (*Editor's Note*: *See page* 8.) Well based with an excellent background in this subject, Dean Woolrich answered many of the questions of this group.

Arthur G. Levy has been appointed by the Board of Directors to serve as Second Vice-President of the chapter to fill the vacancy resulting from the resignation of Fred C. Brandt, who has been transferred to Dallas. V. P. Parr has been appointed Chairman of the Code Committee to fill the vacancy created by the resignation of J. E. Means, who resigned because of ill health.

Lockwood Speaks To Galveston Chapter

President of TSPE Mason Lockwood spoke to the Galveston County Chapter at their June meeting held at Teichman's Point. In an informal picnic atmosphere, Lockwood discussed the aims and purposes of NSPE.

Future meetings have been scheduled for the summer months. For July, a film was shown on the subject of "Soil Stabilization." For the August meeting, Mayor Cartwright will speak on the subject of "The Galveston Wharves Operation." A dinner meeting has been planned for Texas City in September.

Arizona Society Sponsors Radio Programs On Engineers

Under the direction of Engineer Americo Lazzari, chairman of the Public Relations Committee, programs are being prepared for presentation over the radio to inform and explain to the general public the things they should know about the professional engineer.

The programs will cover such subjects as the laws of the State as pertain to engineers and engineering, the responsibility of the engineer to the public and the public service he performs in all his work, the aims of the Arizona Society of Professional Engineers and how it as an organization is willing and anxious to help civic groups in their problems. It will also be stressed how to watch for and avoid unethical practices of individuals and firms offering to practice engineering or to give free engineering advice:

The programs will be presented over Radio Station KOOL, Phoenix, as a public service feature of the station.

150 Engineers Make Reservations For Convention

The committee in charge of preliminary arrangements for the coming annual convention of the West Virginia Society of Professional Engineers at The Greenbrier, White Sulphur Springs, September 1 and 2, is pleased with the indication of interest on the part of the membership. Already the State Office has received tentative reservations of approximately one hundred and fifty engineers and their ladies. This is much greater than advance response to any previous State Society convention.

Officers of the National Society of Professional Engineers, and of the professional societies in neighboring states, have been invited and a num-

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ber of them have announced their intentions of meeting with the West Virginia engineers.

Any engineers who have not notified the State Office, by postcard or otherwise, whether they will be present, are urged to do so promptly. This information is necessary in order that the convention committee may keep the hotel management accurately advised of probable attendance.

Southern Arizona Chapter To Accept EIT Members

The Southern Arizona Chapter, Arizona SPE held a recent meeting at Tucson.

Plans were made to amend the Chapter Constitution to include the EIT's as members in accordance with the amended State Constitution and a vote will be taken at the next meeting.

The Chapter now has 30 members. Plans are being formulated for a membership drive in the area.

Parkersburg Chapter Hears Goodyear Official

The Parkersburg Chapter, W. Va. SPE, met recently in Parkersburg and heard R. L. Thornton. Goodyear tire and Rubber Company official, of that city.

Preceding his address, Thornton showed a moving picture entitled "The Way Out." The film showed several installations of rubber conveyor belts used for moving coal out of mines.

The speaker listed advantages of using rubber belt conveyors instead of other types in moving materials. Thornton is a professional engineer registered in Ohio and West Virginia.

Summer Meeting Planned In Badger State

The summer meeting of the Wisconsin Society of Professional Engineers will be held at Wisconsin Rapids on September 8th and 9th.

The meeting which will be sponsored by the Wisconsin Valley Chapter, will include many important committee reports, notable speakers, and a complete program for the ladies.

Wichita Chapter Inspect New Airport

More than 35 members of the Wichita, Kansas Engineering Club, and the Wichita Chapter, Kansas Society of Professional Engineers, attended a joint meeting held recently at the Municipal Airport.

Following luncheon, plans for the extension of the airport were reviewed by airport officials, and later a tour was taken of the area.

Governor Heeds Georgia Society's Plea For Board

At a meeting of the Board of Direction of the Georgia Society of Professional Engineers last February, action was taken to urge the Governor of the state to appoint an Engineering Advisory Board of professional engineers. After weighing the proposal, Governor Herman E. Talmadge, recently issued an Executive Order establishing such a board and named to it seven professional engineers, all members of the GSPE and NSPE.

Lawrence W. (Chip) Robert, was named chairman of the Board which is designed to stimulate industry and agriculture in development of Georgia's natural resources.

The seven-man board will review engineering and technical reports coming to the state department of commerce. Such reports are expected as a result of several federal multi-purpose dam developments in the State.

Other members of the board, in addition to Mr. Robert, are Roy J Boston, of the state health department, a sanitary-civil engineer; Joseph L. Eley, of Atlanta, a mechanical engineer; Benjamin H. Hardaway, of Co-

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lumbus, a civil engineer; Curtis A. Mees, of Atlanta, a civil-hydraulic engineer; Garland Peyton, of Atlanta, a mining engineer; and Alan G. Stanford, of Atlanta, an electrical engineer, and Past President of the National Society of Professional Engineers.

Harold H. White, Chairman of the Atlanta Chapter Legislative Committee, was instrumental in getting the resolution to form the board through the Georgia Society.

Kansas Board Meets In Wichita

The Board of Direction of the Kansas Society of Professional Engineers met in the Allis Hotel at Wichita recently. All members were present with the exception of the Treasurer, Carl Gray. Mr. John Brink, Chairman of the Public Relations Committee also attended.

A highlight of the meeting was a discussion of dues. It was proposed that each chapter decide for themselves what chapter dues should be. The proposal was aimed at increasing membership in the Society.

Goodkind Honored For Accomplishments; Singstad Gets Degree

Morris Goodkind, of New Brunswick, N. J., State Highway Department Bridge Engineer, and Past Vice President of NSPE, was honored in two memorable events recently.

A Testimonial Dinner at the Robert Treat Hotel, in Newark, marked the completion of his 25 years in the service of the State. Later, the Newark College of Engineering confered on him the Honorary Doctor of Engineering Degree in recognition of his contributions to the State Highway System. At the College ceremonies an Honorary Degree was also given Ole Singstad, NSPE member and designer of the Holland Tunnel, who recently completed the Battery-Brooklyn Tunnel.

West Coast Chapter Holds Annual Outing

The Annual Outing of the Los Angeles Chapter, California Society of Professional Engineers, was held recently at Sunland Park, Sunland, California.

The members and their guests enjoyed such amusements as swimming, horseshoes, tennis and other recreational activities.

Pittsburgh To Have Speakers Bureau

The Pittsburgh Chapter, Pennsylvania SPE, has initiated a Speakers Bureau.

Members have been sent cards which they are to fill out and return if they would like to participate in the Bureau's work. The chapter states that the purpose of the program is to get more engineering speakers before such popular groups as the Rotary, Kiwanis, Lions and PTA.

Kings County Group Plan '51 Convention

The Kings County Chapter, New York State Society of Professional Engineers, has announced plans are already in the making for the 1951 Convention in Engineering Industries Exposition which will be held in New York City May 10, 11, and 12, 1951.

Since the general assembly of the New York State Society of Professional Engineers took place on May 11, 1926, the coming meeting will be designated "Silver Anniversary Convention."

All Members Idaho Board NSPE'ers

All members of the Idaho State Board of Engineering Examiners are now members of the Idaho Society of Professional Engineers, NSPE.

Orland C. Mayer, Past Vice President of NSPE and Past President of the Idaho Society of Professional Engineers, was recently appointed by the governor for a five year term on the Board. Other members are Raymond Briggs, Past President of the Idaho SPE; W. E. Hughes, Past President of Idaho SPE; H. P. Flint, Present Vice-President of Idaho SPE; A. S. Jansen, Present President of Idaho SPE; and Present Chairman of the Board of Engineering Examiners; and H. Senger, member of the Idaho SPE.

Mr. Senger is completing ten years as a member of the Board.

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What They're Saying

(*Continued from page* 15)

There is need for continuous training on an informal basis as the young engineer moves along in his career. In the earlier phases, it is important that he be placed with an experienced engineer who has a healthful outlook toward the profession and an understanding of the problems confronting the young engineer. He should have the qualities of a good teacher. A sympathetic approach will do much to bring out the young man's good qualities and strengthen his shortcomings.

4. *Education*

Continued education is an integral part of an effective development plan. Encourage the young engineer to plan his own self-improvement program. It will keep him mentally alert, broaden his background, and provide a foundation for future assignments. Moreover, his educational pursuits give him a sense of personal accomplishment.

In recent years a number of companies have arranged extensive evening educational programs on both the graduate and the undergraduate levels, and the number is increasing. These programs, sponsored jointly by certain universities and companies, are making a real contribution. In areas where this form of education has been tried, the programs have the enthusiastic support of faculty, management, and employees.

5. *Professional Activities*

Participation in the engineering societies and civic organizations does much to develop the well-rounded individual we want. Contacts with people with different backgrounds and interests broaden his point of view and bring new ideas into the company.

6. *Executive Development*

An executive talent search and development program is a must. Under our six-point plan, we do not have to start from scratch in developing executive leadership. The programs outlined in the foregoing paragraphs provide a foundation and bring potential leaders to the attention of top management. Our point 6, therefore, concerns itself with grooming these men on the lower supervisory levels for positions of larger responsibility.

Our basic six-point plan is a flexible one. It is adaptable to companies large or small. I have attempted to prepare a basic design only. The details of the individual programs and the way of operating them must be tailored to fit the needs of the particular company. In large organizations, the plan would be coordinated by the training department or a personnel development group. In the smaller companies, all that is needed is top management's support, and a man who is interested in devoting part of his time to such an activity.—*By* J. C. McKeon, *June, 1950, Mechanical Engineering.*

OUR DUTY IN WAR . . .

The engineer has always played an important part in warfare and National Defense; and the technically trained man will continue to play an increasingly important role in our over-all defense program. Future wars, however, will not be fought exclusively by engineers and others with technical training. World War II was the most mechanized in history and it required the greatest number of men to wage it. There is no sound reason to believe that we shall need fewer men to defend our country in the future.

Even in the atomic age, we need more than a battalion of push-button operators. Ground, Air and Naval forces will continue to play an important part. In consequence, the military engineer will continue to perform the old-fashioned role of assisting the advance of combat elements and providing the facilities at home and abroad which our forces require.

Military engineers still have to think in terms of bases, landing strips, ports and port facilities on foreign shores, creating and maintaining communications facilities by rail and by air or road and performing the many and varied services needed in modern warfare. The faster and more extended the operation becomes in terms of time and space, the more vital the role of the engineer.

Complicating the task of the military engineer is the fact that our home ports and production facilities as well as our lines of communication are now within range of enemy fire power. The atomic bomb, the long range bomber, the guided missile, and the ocean-ranging snorkel submarine have nullified to an appreciable extent our natural defenses of time and space.

In our industrial capacity, however, we have one clear physical advantage over any possible opponent. No nation can now, or in the foreseeable future, equal the mass production capacities of our factories. In the technological warfare today, therefore economic mobilization is just as important for national survival as the actual creation of military units. In this the engineer is the key man.

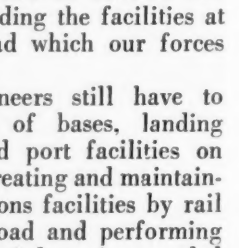
Industrial mobilization plans are not perfected over-night. They require the joint efforts of military planning experts, procurement authorities, military engineers, industrial ownership and management, and the entire labor force. The planning must be completed in peacetime if peak production is to be reached with the least possible delay after M-Day. The plan can not be static, but must be subject to constant revision to take utmost advantage of new plant facilities, new industrial processes, and other economic developments.

One element of our industrial mobilization plan, the dispersion of plant facilities, requires serious consideration. Although this problem has many economic facets, it is largely an engineering consideration once the top policy decisions have been made.

Blueprints for factory conversions and dispersion of vital industry, moreover, are incomplete without adequate plans for civilian defense. If panic terrorizes communities in which factories are located or if workers are constantly worried about the safety of their families, industrial output is sure to suffer. It goes without saying that the tin hat and the sand bucket will not suffice in a future emergency.

We must now think in terms of underground shelters for the civil population, of protection for utilities and water supplies, of transportation of foodstuffs and other necessities into our urban centers. These are primarily engineering problems and the technical man, such as the engineer, will be looked to for leadership in preparing protective measures.

In this concept of total defense the engineer is one of the most important factors. He may be in uniform or out. He may devote full time, or only part time to active training and preparation. He may never fire a gun nor win a medal and still be responsible in a very great degree for the defense of our nation.—John R. Hardin, *Colonel, Corps of Engineers, in the Military Engineer.*



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